TELEPHONY

The Journal of the Telephone Industry

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VOLUME 118

APRIL 20, 1940

NUMBER 16

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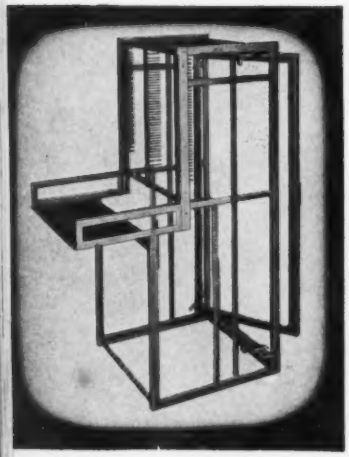

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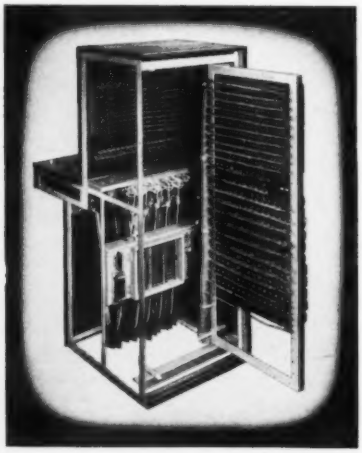

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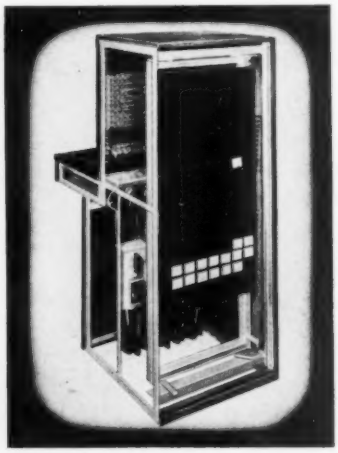

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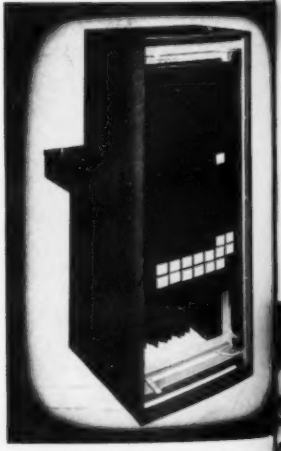

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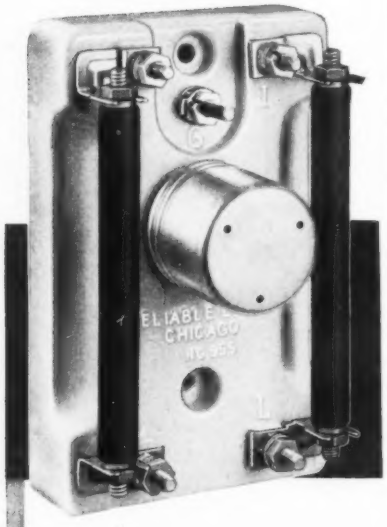

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Telephony

April 20, 1940 Vol. 118, No. 16

In This Issue

SELLING THE TELEPHONE!..... 5
By Horace Kramer

IN THE NATION'S CAPITAL..... 8
By Francis X. Welch

AN ELEMENTARY COURSE IN TELEPHONE TRANSMISSION (second article) 11
By H. H. Harrison

NEBRASKANS TAKE "TIME OUT" TO STUDY THEIR BUSINESS.. 16
By H. T. Dobbins

RARE GAS RELAYS ELIMINATE NOISE ON TELEPHONE LINES. 22
By D. H. Townsend

FINANCIAL NEWS AND DATA... 25

THE OPERATORS' CORNER..... 27
By Mayme Workman

Coming Conventions 9
Best Story of the Week — What's Yours? 10
With the Manufacturers..... 28
Commission and Court Activities... 30

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XUM

SELLING THE TELEPHONE!

By HORACE KRAMER

***COMPETITION FOR** the consumer's dollar brings telephone people face to face with the need for effective salesmanship in their own industry. When farmers have money for other modern conveniences but not the telephone, it is time to discard all alibis and go to work. Through this new series, beginning in this issue, TELEPHONY will present selling factors recognized in modern merchandising which are applicable to the telephone industry*

AS ONE GETS along in years it seems as though the memory of certain events or periods of youth take on an added sharpness and reality. In my own case at any rate, I remember many things that happened 30 years ago more clearly than others that date back but a third as far. One of these "high spots" of youthful memory is the coming of the telephone to our farm up on the Dakota prairies.

There already was a telephone exchange in our little trading town, and it sent a few tenacles out to the prosperous homes of what we called the "city farmers" round about; but our home was far out in the grass where a laden trip to town and back was a full day's work, and where a common practice was to fly a bed sheet from the roof of the cow shed to announce to neighboring women the imminence of the stork and that they'd better hurry over.

I can remember clearly the feeling of satisfaction—of downright gratitude even—when our long and pleading negotiation with Mr. Hornbeck, owner of the town exchange, came to a successful fruition and we were to have telephones.

Now we would be safe, now we could get the doctor in three hours instead of six, telephone in for a part for the mower and have it come out on the Star Route day after tomorrow, without losing a whole day from the haying; and, by no means least, we could "rubber" on the line to the neighbors' talk, perhaps offering an observation of our own now and then, and thus in some measure lift the isolation that weighted down our days and nights.

It seemed fitting that we should set our poles, string the wire, buy the equipment, and pay for the privilege of using it. To us, Mr. Hornbeck was a public benefactor; but as I look back now I can see that he was the most unobliging, pig-headed, and discourteous public benefactor imaginable. However, our eyes were so filled with the wonderful novelty and privilege of the telephone that these far outweighed the shortcomings of Mr. Hornbeck and his service.

It seems to me that people were more patient in those days; at least we were. Our lives seemed to be ordered by the will of monopolies —the railroad, the storekeepers, the packers, the coal mines, and then the telephone. They made the rules, set the prices, and we conformed.

Now and then a windy prophet might rise up to denounce them and advocate some crack-pot remedy, but for the most part we just took them as we did the blizzards, Texas itch, and prairie fires — Acts of God—and tried to live with them. The mail-order companies were breaking the monopoly of the storekeepers before I left, but the others were still in full flower.

I made a sentimental journey back to the old home a year ago, and there on the wall was the same old oak box — and it was out of order! "I don't know why we keep it, with times so hard," said the mistress of the house. "Pa gets his market reports over the radio, and we can whip into town or over to the neighbors with the car in a jiffy.

"It's nice in the winter when the roads are blocked—one feels safer with it somehow—but every storm seems to put it out of commission just when we might need it most."

Mr. Hornbeck had long since been gathered to his punishment, but evidently his heirs were still carrying on according to the old dispensation.

The world has turned over several times since those days and many of the old concepts that seemed so rock-ribbed and enduring have "gone with the wind." The old monopolies seem to have been the greatest sufferers — probably because the workers in a monopoly were too often prone to regard themselves as invested with some sort of Divine right and, by their attitude toward the public, invited the competition that has infringed so seriously on many of their formerly sacred prerogatives.

One needs not be very aged to recall the indifference, often the arrogance, of railroaders—both management and employes. They don't

FRONT COVER

The scene on the front cover has been called the civic center of Columbus, Ohio: The building with the tower, reaching toward the billowing clouds, is the American Insurance Union Building; the low building in the foreground is the Columbus City Hall, and to the extreme right is the State Office Building.

These landmarks and others will be seen next week by Ohio telephone men and women when they gather in Columbus for their annual convention on April 23 and 24.

XUM

burn coal any more back at the old farm home. It is still to be had, of course, but a salesman drove out one day and now they have an oil heater.

This long preamble is to point up the moral that nothing in this world ever "stays put." The world moves and with it products, methods, ways of doing things, ways of thinking. No business, no individual, may stand still. To try is to have progress and success pass on by, which, in effect, is to go backward.

Are Telephone People Alibiing Over Loss of Telephones?

What happens when a business or an industry starts to contract? Let's be more specific and ask what happened to reduce the number of telephones during the past difficult years? Surely it was not due to a slackening of the desire or the need of people to communicate with one another. It is simple enough to say that the contraction was due to hard times, decreased incomes. But that isn't an explanation—that's an alibi. An alibi, in modern business usage, is self-balm, the excuse of one who admits himself licked and has quit trying.

No, the shrinkage in telephones was not due to hard times. It was due to competition. Competition is a fighting word; it is something a fellow can get his teeth into and cope with, but the difficulty is that the real nature of competition is rarely understood, with the result that in striving to cope with it, people usually go off at tangents and make things worse.

Thus, the Ajax Service Station finds business slow and arrives at the brilliant idea of reducing gasoline a couple of cents below the posted price. This stirs up the Bjax Station, which meets the cut, with the result that things are right where they were and neither station making any money. And all the time the Cjax Station is getting the full price, and making up for its reduced gasoline gallonage with better salesmanship in pushing the many other services of the station.

That's one sort of competition and two methods of dealing with it. That's the sort of competition people usually think of. But there is another, deeper, and more mysterious sort of competition that is just as radical in its effects, and just as devastating to the business man who does not understand it, as simple price-cutting.

That is the competition for the consumer's dollar.

People dispose of *all* the dollars of their income. They should, and many do, take a little off the top for the inevitable rainy day, but the rest goes for the business of living, playing, and putting on airs. Of late years the sum of this available money has been restricted, but there still has been enough of it, over and above bare necessities, to build and fatten a number of great industries—products starting out as semi-luxuries but quickly winning their way into the necessity classifications.

Consider a few "depression babies" that have grown and prospered in the years of restricted income: Myriads of electrical devices that make the home more pleasant and easier on Mother. Millions of high-priced mechanical refrigerators, oil burners, stokers, and such. The phonograph and record business has staged a sensational comeback, right in the teeth of the WPA. Observe the growth of luxury air travel. More pianos—pure luxury articles—are sold today than ever in history. Five million dollars spent to see "Snow White"!

Who gets all this flood of "hard-times" money? Good salesmen get it—good salesmen who *know* they have a selling job on their hands.

Where does it come from? It comes out of the pockets of the good old substantial businesses that have long since "arrived," and which have long since come to look upon their products and services as indispensable staples.

Let's illustrate this with a depression scene in the home of the well-known Smith family: Mr. Smith comes home and says: "Ma, we'll have to cut down somewhere; I had to take a pay-cut today." Or perhaps it isn't so bad; perhaps Ma says: "Pa, there was a man here today with a new kind of electric washer that I'd give an eyetooth to have—it would save my poor back. Do you reckon we could afford it? It costs quite a bit, but the payments are small."

And Pa says: "Well, I don't know. The budget is stretched all out of shape right now, what with that insurance I bought, the payments on the car, the radio, and the ice box. I'd like to see you get the washer, but I'm afraid we'd have to give up something to offset it."

Ma ponders this deeply for a time and is then struck with a brilliant idea. "I'll tell you what we'll do, Pa," she says. "We'll give up the telephone for a little while. I'm sick of looking at the old box anyhow, screaming at the rest of the furniture. I'd hate to do without a 'phone, of course, but I'd rather have the washer."

And so the local telephone company buys Ma a new washer.

That is what is meant by the competition for the customer's dollar. It is an intense, ever-pushing, resourceful, and aggressive competition; and as long as we live in a country of free initiative, it is going to stay with us. It is a competition that will continue to create new wants to absorb every dollar of hoped-for increased income.

One who is living with an alibi, as we defined it, awaiting the return of "good times" when his lost business will come back to him under its own steam, is probably in for a disappointment. The road back will be beset with good salesmen who will pocket the dollars before they come within hailing distance.

This prophecy seems to prove itself by what has already happened. There is no way of telling, of course, but it would be a safe guess that at least 90 per cent of the telephones taken out during the past difficult years could have been maintained had the subscribers valued them as much as they did the cars, radios, refrigerators, and what not, whose numbers increased in the millions while the telephones were decreasing. There is a dynamic factor in there somewhere, and it seems to point directly to *salesmanship.*

The Art of Selling Means Understanding Human Nature

It is high time, therefore, in view of what has been going on, and the adding of a number of millions more of potential telephone users to the population, that the telephone also receive the benefit of some effective salesmanship.

Salesmanship is a somewhat mysterious and rather badly abused term. Learned professors have been taking it apart and putting it together for a long time, and usually come out with formulae so intricate and involved as to be unworkable, or discover to their dismay that what they have been considering to be a "science" or an "art" is merely one phase of common, everyday human relationships.

Since we are now to have some salesmanship in the telephone business it will be helpful to find out just what will be involved. Let's

NEW SERIES ON SELLING!

In view of the need for selling effort in all branches of the telephone field, TELEPHONY has arranged for the publication of a series of articles which deal with factors of success in selling as they are recognized in modern merchandising.

HORACE KRAMER, the author of this new series of ten articles, is a business writer of long experience and established reputation. For years he has been director of sales promotion and sales training of La Salle Extension University, Chicago. He has also set up and written sales training programs for such organizations as Standard Oil and Chrysler companies, and numerous national trade associations. Mr. Kramer's written work has always been noted for its human quality and its sound practicability.

With the knowledge of sales promotion methods and sales training which Mr. Kramer has

obtained as a result of his wide experience in various fields, this series of articles should be of great value and benefit to all engaged in telephone work and especially to those employed in small exchanges.

start with the idea that the telephone is a perfect device and that the plant and equipment of the industry is completely modern and the last word in technological progress—just the idea, that is, to simplify our concept.

So far, the telephone industry is a dead thing—the thousands of exchanges, miles of wire, conduit, cable, etc., just so much inert material without body, mind, or soul. It must be brought to life—by the human minds, and wills, and ambitions that build and operate it.

It is often said that anything of a material nature is but the projection of the human mind that conceived it, and that the *quality* of that material thing—a shanty or a palace, a sidewalk stand or a department store—is also a projection of the quality of the mind and vision that conceived and built it.

This is true, and it must follow that the physical telephone is a projection of minds and visions; it cannot sell itself, any more than it can originate the good news or the bad news it transmits. It is merely a means.

So we can at once relieve the telephone of the burden of selling itself. It has been obliged to do a good part of it in the past, but we have seen what competition is doing now, and we must pitch in and help.

Since the human mind, and not its projections, is the dynamo that moves things in this world, we must realize that the effectiveness of the salesmanship the telephone is to enjoy—or suffer—must be measured by the effectiveness of the minds that employ the salesmanship. Effectiveness, in turn, is the reflection of certain fundamental human qualities. If we identify these and strive earnestly to develop them, then the "science" and the "art" of salesmanship pretty much take care of themselves.

It will be the purpose of this series of articles to identify these qualities and to illustrate their direct bearing upon the selling job that is to be done in advancing the fortunes of the telephone and of those who look to the industry for their own personal success.

▼ ▼

"Night Operator" in Current Magazine Should Be Read

The April 13 issue of the Saturday Evening Post contains an article that everyone engaged in telephone work should read. It is entitled "Night Operator" and was written by Ethel Sutherland. "It is a grand tribute to the too-little sung praise of the telephone operator," writes one telephone man to TELEPHONY.

"If every telephone user," he continued, "would read this story, a great many of our public relations problems would be greatly softened if not completely cured of the thing which causes most all troubles—misunderstanding."

Telephone people can do a great deal to have this read by drawing attention to it, possibly through the advertising columns of their local newspapers or in other ways, he suggests.

▼ ▼

Commissioner Walker's Address Before California Club

To avoid any misleading impression, TELEPHONY directs the attention of its readers to the fact that the article published in the April 6 issue, page 13, on "Developments and Improvements in Long Distance Telephony" was obtained from excerpts of an address entitled "Communications a Vital Factor in Our National Life" by Commissioner Paul A. Walker of the Federal Communications Commission. It was delivered before the Commonwealth Club of California in San Francisco and released in full text to the press generally.

As indicated in the April 6 issue by the introductory paragraph in bold face type under the heading, this article was not written by Commissioner Walker for TELEPHONY magazine.

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"Pot O' Gold" Radio Program Ruled No Lottery

The U. S. Department of Justice on April 12 advised the Federal Communications Commission that the "Pot O' Gold" radio program does not violate anti-lottery laws. The FCC had asked a study of complaints involving the program, which disperses big cash awards each Tuesday night.

The winners are holders of telephone numbers selected from directories by chance.

The Justice Department also held that the "Mead's Bakery," program, broadcast in Texas, does not violate lottery statutes. It is a similar program.

"After a thorough examination of the material submitted and a careful consideration of the facts presented," wrote Assistant Attorney General John Rogge in charge of the criminal division of the Department of Justice in a letter dated April 10, "the Department has concluded that prosecutive action under section 316 of the Communications Act of 1934 in these two matters should not be instituted."

in the Nation's Capital

by Francis X. Welch

Special Washington, D. C., Correspondent for TELEPHONY

***IMPLICATIONS IMPORTANT** to the Independent industry are contained in the ruling of the Wage-Hour Administration relative to wages and hours of learner operators. . . . "Key" inventions, of which 19 were selected as the greatest from a list of 80 American inventions, include the telephone. . . . Television industry placed in limelight last week following a recent action of the FCC*

THE EXEMPTION for learner operators recently authorized by the Wage-Hour Administration is not going to amount to very much in terms of dollars-and-cents savings to the average exchange. As a matter of principle and precedent, however, it may turn out to be an important aid to the Independent telephone industry.

The recommendation of Dr. Gustav Peck, assistant director of the hearings division (and approved by Wage-Hour Administrator Philip B. Fleming), authorized a learning period of 320 hours, or approximately eight weeks, at a substandard minimum of 25 cents an hour for those Independent telephone exchanges not already exempt (under the terms of the Herring-Ramspeck amendment) from the application of the wage-hour law generally.

This exemption is contrasted with the prevailing statutory minimum of 30 cents an hour—or a saving of five cents an hour. Furthermore, the number of learners is limited on a sliding scale basis, ranging from one in exchanges employing up to eight operators to one for each 15 operators employed in larger exchanges. You are probably already familiar with these details.

The USITA would like to have obtained a 20-cent rate for a six-month learning period. Let us see how this nickel-an-hour saving works out in practice. Assuming that the general average ratio of learners to experienced operators is about one to twelve, and that, in the ordinary turnover of operators, there would not be need for more than one apprentice per year (for each 12 operators), the nickel-an-hour saving amounts to just $16 a year out of an overall annual payroll for the total 13 operators of nearly $8,000.

Furthermore, to obtain this princely saving of $16 a year it becomes necessary for the Independent telephone company to file a claim for the exemption with the Wage-Hour Administration and obtain a "learner certificate" for each learner so qualified. And this certificate must be prominently displayed at the exchange during the period of training. Obviously, the red tape, in the case of some Independent companies, is going to come pretty close to outweighing the actual benefits received.

BUT IT WOULD be unfair, in view of the vigorous fight made by the USITA wage-hour committee, to judge this exemption solely on a dollar-and-cents basis. There are implications that go further.

First of all, there is the official recognition (for the first time recorded on the rolls of the federal government) that Independent telephone companies must be judged by an entirely different economic standard than can be applied to companies of the Bell System. There is also official recognition, however small in extent, that the Independent telephone companies are being especially hard hit by the application to them of the federal Wage-Hour Law.

Perhaps still more important was the official recognition of the cogency of the testimony of Mrs. Mayme Workman, traffic supervisor of the Illinois Telephone Association, Springfield, that "most girls have rigid jaws, stiff lips, and lazy tongues," which was referred to by the wage-hour division in its announcement of Dr. Peck's decision. It was also noted that "the average beginner after two weeks handles only about 50 calls an hour, while a girl with a year's experience can handle 150 or more calls per hour."

Inasmuch as the handling of "from 150 to 225 calls" constituted an experienced operator, according to the testimony cited by Dr. Peck, there is perhaps some basis for speculation as to why the Wage-Hour Administration was so conservative in cutting down the allowable period of learner exemption to approximately eight weeks (in view of the fact that it takes about a year for the average operator to reach the highest point of efficiency).

Nevertheless, appearing as it does on the records of an administrative branch of the federal government, this recognition of the economic problem of training telephone operators may prove quite useful in future regulatory proceedings throughout the states. For example, the next time a state commission in a telephone rate case begins to pick over the item of development expenses, the telephone company has good authority to substantiate expenditures for the organization of trained personnel.

Finally, there may come a time (perhaps when a somewhat different political atmosphere prevails in Washington) during which Congress would be more disposed to re-examine the basic question of making a more liberal exemption of Independent telephone companies from the application of the wage-hour law than was afforded in the Herring-Ramspeck amendment.

When and if that time comes, this virtual admission of the Wage-Hour Administration, that the federal law has put the Independent telephone group on such a tough spot that it requires special treatment and relief, will surely prove to be a weighty argument in favor of more liberal amendatory legislation. And it should also be remembered that in the days of the NRA, after long debate, the administrator found the Independent companies required a code different from the Bell code.

THE TEMPORARY National Economic Committee, better known as the "O'Mahoney committee," was scheduled to take up this week a study of technological developments involving the telephone industry. The TNEC has been engaged for the past two weeks in looking into the effect of industrial technology on labor employment and upon our political economy generally. The telephone testimony was to include witnesses for both the American Telephone & Telegraph Co. and employes of the telephone industry.

Speaking of technical progress, the United States Patent Office last week celebrated its sesquicentennial anniversary with quite a big doings. These included a banquet at which "Miss Communications" appeared in a dress embroidered with telephone wires, a "bolero" covered with ticker tape, and a necklace of telephone dials. On her head was a crown of radio tubes which impartial male observers said was quite an improvement over the prevailing style for ladies' spring hats.

As part of the celebration, a committee of 75 scientists and industrial executives examined 80 American inventions and selected 19 as "the greatest." The 19 selected were Whitney's cotton gin, Fulton's steamboat, McCormick's reaper, Morse's telegraph, Goodyear's vulcanization of rubber, Howe's sewing machine, Sholes' typewriter, Westinghouse's airbrake, Bell's telephone, Edison's phonograph and incandescent lamp, Tesla's induction motor, Hall's aluminum process, Mergenthaler's linotype, Edison's motion picture projector, the Wright's airplane, de Forest's three-electrode vacuum tube, Baekeland's thermosetting plastics and Burton's oil-cracking process.

You will observe that these are all "key" inventions — meaning inventions which opened up an entire new line of thought, created new industries and placed a distinctly original service at the disposal of the human race. Obviously, some of these very key inventions could never have gotten beyond a relatively elementary stage without valuable contributory and supplemental discoveries, such as Stanley's alternating current transformer which made widespread electric power distribution feasible, or Pupin's loading coil which made modern long distance telephony practicable.

Foreigners may pick flaws with the list as being a little too heavily-weighted on the patriotic side in favor of American citizens. The French, for example, claim that moving picture projection was the invention of Loumiere. The English dispute Fulton's credit for the steamboat. But that is one of those controversies that will probably never be settled.

One significant angle of the committee's list, however, is the fact that of the 19 inventions selected as "the greatest," six resulted in the creation of vital public utility industries. These are (1) the cotton gin (regulated as a utility in southwestern states); (2) the steamboat; (3) the telegraph; (4) the telephone; (5) the incandescent lamp, and (6) the airplane.

IT IS INTERESTING to note that the new industries brought into existence by these key discoveries did not get started overnight. With the possible exception of radio broadcasting, practically all of our great industries which resulted from American inventions took from 15 to 20 years to become important factors in our American economy.

This idea was expressed before the TNEC by Dr. Charles F. Kettering, vice-president of General Motors, whose evidence was to the effect that while the first 25 years may be the hardest in the life of a new industry, it is the second 25 years that really counts in terms of important expansion. Certainly this was true in the case of both the electric and telephone utility industries which were born around the same time.

Take, for example, the telephone in the history of the State Department at Washington. Today it is the most important form of communication used in our diplomatic service. It enables the Secretary of State, and in some instances the President, to communicate with ambassadors and ministers in the farthest corners of the earth.

And yet in 1881, five years after Bell's discovery of the telephone, there was only one telephone in the State Department. It was located in a room adjoining the office of the chief clerk. One day, July 2, 1881, after it had been installed about two months and had rung not more than a couple dozen times, Sydney Y. Smith, recently retired chief of the diplomatic bureau, heard this new-fangled gadget ring and answered it.

A voice crackled and Smith turned to the chief clerk to say that he actually believed the White House was attempting to tell them that President Garfield had been assassinated. The chief clerk took the receiver and confirmed the tragic fact. It was the first important communication over the telephone recorded by the State Department.

COMING CONVENTIONS

Ohio Independent Telephone Association, Deshler-Wallick Hotel, Columbus, April 23 and 24.

United States Independent Telephone Association, Spring Conference, Stevens Hotel, Chicago, May 1 and 2.

Indiana Telephone Association, Claypool Hotel, Indianapolis, May 8 and 9.

Pennsylvania Independent Telephone Association, Yorktowne Hotel, York, May 16, 17 and 18.

Wisconsin State Telephone Association, Park Hotel, Madison, May 22 and 23.

The Illinois Telephone Association, Hotel Pere Marquette, Peoria, May 28 and 29.

New York State Telephone Association, Hotel Syracuse, Syracuse, June 5 and 6.

California Independent Telephone Association, Miramar Hotel, Santa Monica, June 19 and 20.

Oregon Independent Telephone Association and Washington Independent Telephone Association, Gorge Hotel, Hood River, Ore., Joint Meeting, June 28 and 29.

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And, yet, *14 years later*, in 1895, there were still only two telephones in the State Department, one in the outer office of the Secretary of State and the second in the corridor for the use of officials and employes. Today, in addition to an inter-office dictaphone system, there are more than 500 telephones in the State Department building.

Ironically enough, despite its slow acceptance, telephonic communication has now become such an important factor in our diplomatic service that the Secretary of State (now Chief Justice Charles Evans Hughes) as early as 1924 had to refute suggestions of the members of the committee on foreign affairs of the House of Representatives that elaborate diplomatic missions in foreign countries (ambassadors and ministers with their staffs) could be done away with and some responsible person substituted simply to answer the telephone and carry out instructions emanating from Washington, D. C.

Secretary Hull, 14 years later in 1938 (during which time transoceanic telephone service had become perfected), had to deliver a similar warning against the idea that the perfection and rapidity of modern communications had reduced the role of foreign service to the subordinate task of carrying out instructions from the home office delivered by cable or telephone.

Best Story of the Week— What Is Yours?

The commercial representative of the Portsmouth Home Telephone Co., Portsmouth, Ohio, was recently instructed to obtain a service application signature from a Mr. Justus who was employed in the capacity of an embalmer at a funeral home. A man came to the door of the funeral home in answer to the ring of the doorbell and the telephone company representative asked to see Mr. Justus.

"Certainly, follow me, please," said the man. He led the representative to a side room where, much to the latter's surprise, a body was lying in state.

It developed that the dead man's name was Justice, and the name of the prospective subscriber who had answered the door was *Justus*, so the telephone company representative was not too late to clinch the sale, as he had at first believed. After the latter had recovered from the shock, the differences in identity were straightened out and the contract was signed by the proper party.

LAST WEEK the baby industry of television literally provided a three-ring circus in Washington: (1) The FCC was going ahead with its "after-thought" hearings on whether or not to permit commercial television; (2) the Senate interstate commerce committee was considering whether it ought to permit the FCC to continue with its apparent vacillating attempts at regulating television promotion; (3) at the White House President Roosevelt, after talking over the situation with Chairman Fly of the FCC on April 11, discussed the subject at one of his regular press conferences and indicated his endorsement of the FCC's position so far.

There has been so much argument about who is retarding the progress of television that the average man on the street must surely be completely baffled if he has taken the trouble to follow the recent developments at all. What it all boils down to is about this: The FCC is trying to assume the role of a kindly and efficient nurse maid in the care and feeding of an infant industry. But the industry is beginning to regard the FCC as a fussy old lady who can't make up her mind for two weeks running.

The truth probably lies somewhere between these views and your correspondent believes that the various points of issue will soon be compromised in such a way as to let television go ahead without any more regulatory turmoil.

You may recall that on February 29 the FCC, after considerable urging from the television manufacturers, led by RCA, decided to allow television to go on a limited commercial basis. Heretofore it has been restricted to experimental operations (which means that it cannot raise any money from commercial advertisers).

Shortly after that, RCA, apparently under the impression that it had a green light to go ahead with the sale and distribution of receiving sets, began to advertise a receiving set having certain standards (441 lines per image) for public purchase. This brought a howl from a rival manufacturer who claims that he is in the process of bringing out another television receiving set of superior standard (604 lines per image), but that he would be unable to do so if RCA and other manufacturers were allowed to flood the market with receiving sets constructed according to RCA approved standards.

This threw the FCC into a state of nerves and it promptly suspended the order for limited commercial television operation and set the matter down for further hearings, with the astonishing explanation that it was afraid premature distribution of sets of a given standard might retard the progress of television.

During these hearings, testimony before the FCC, as well as criticism in the Senate, indicated a sharp difference of opinion as to who was retarding the development of television. There were some black looks and pointed remarks in the direction of the FCC itself. Again, the FCC became flustered and is now showing signs that it is preparing to step off the track once more and let television manufacturers go ahead. This would be done with the pious hope that some sort of compromise on standards can be worked out.

There have been some unfair criticisms on both sides during this controversy (which may eventually turn out to be a tempest in a teapot). For example, the FCC was criticized in the Senate as definitely blocking further progress of the television industry. Where would the automobile industry have been, one critic wanted to know, if some regulatory board had forbidden Mr. Ford to sell his Model T during the early days on the ground that engineers' blue prints showed it was feasible to construct a more efficient model later on.

Chairman Fly effectively pricked this line of argument by pointing out that there was no true analogy between an automobile and a television set. A Model T Ford can still operate today. But a television set constructed so as to receive images of 441 lines will become absolutely obsolete if transmission standards should later be changed in the interest of clarity, to 601 lines per image or any other or different standard than 441 lines.

The precise coordination between the receiver and the transmitter in television does, to a certain extent, tend to "freeze" television technique as of the time when a considerable distribution of receiving sets takes place.

On the other hand, Chairman Fly himself was perhaps guilty of making his "lock-and-key" analogy a little too strong when he compared the decision that has to be made as to standards of television with the railroad track. Many years ago, dur-

(Concluded on page 36)

An Elementary Course

In Telephone Transmission

By H. H. HARRISON, M. Eng., M. I. E. E.

***THIS SECOND ARTICLE** in the transmission series discusses the mathematical basis of telephone transmission calculations. The first article of this series, written for telephone engineers, appeared in the March 23 issue of TELEPHONY*

IN THE mathematical treatment of electrical circuits such as telephone lines, hyperbolic functions constitute a very powerful tool to apply to the solution of many of the problems which arise. Hyperbolic functions are analogous to the trigonometrical functions sine θ, cos θ, etc., but are derived from the rectangular hyperbola instead of from the circle. They are given similar names to the trigonometrical functions with the letter *h* affixed to indicate that they are hyperbolic and not circular functions.

In Fig. 9-a the vector radius of the circle sweeps out a sector AOP. The area of a circle of radius r is $\pi r^2 = 2\pi r^2/2$. Therefore, the area of any sector $= r^2/2 \times$ (total radians).

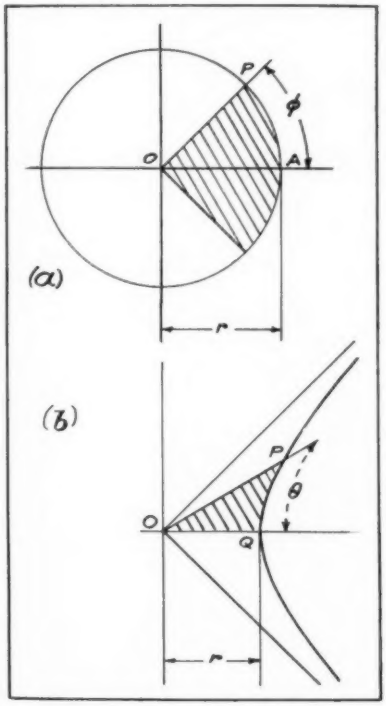


Fig. 9. Relation between the areas of circular and hyperbolic sectors and the corresponding radians.

The area of a circular sector of arc $\varnothing = \varnothing r^2/2$, and the area $A = r^2\varnothing/2$. If $r=1$, $\varnothing = 2A$, or twice the area of AOP which is the total shaded area of Fig. 9-a. Similarly in the rectangular hyperbola (Fig. 9-b) with radius $OQ = r$, $A = \theta r^2/2$, or $\theta = 2A/r^2$, where r is a constant and equal to 1.

Definitions of the Hyperbolic Functions: In Fig. 10

$$PS/OQ = \sinh \theta \quad \ldots\ldots(1)$$
$$RQ/OQ = \tanh \theta \quad \ldots\ldots(2)$$
$$OS/OQ = \cosh \theta \quad \ldots\ldots(3)$$

From inspection it can be seen that

$$\sinh \theta/\cosh \theta = \tanh \theta \quad \ldots\ldots(4)$$

for $(PS/OQ)/(OS/OQ) = PS/OS = RQ/OQ$.

$$\text{Also, } \tan \varnothing = \tanh \theta \quad \ldots\ldots(5)$$

Fig. 11 is a graph of three of the hyperbolic functions. It will be noticed that $\tanh \theta$, unlike its corresponding circular function $\tan \theta$, does not increase indefinitely with θ but approaches the value unity as θ increases. For small values of θ, $\sinh \theta = \tanh \theta = \theta$. It can already be seen that there are several analogies between the circular and hyperbolic functions, and yet more exist as will be shown later.

Expression of an Hyperbolic Angle θ *in terms of Exponentials:* In Fig. 12,

$$\text{Cosh } \theta = OB/OA \text{ and since } OA = \sqrt{2},$$
$$\text{Cosh } \theta = OB/\sqrt{2} \quad \ldots\ldots(6)$$
$$\text{Sinh } \theta = CB/OA = CB/\sqrt{2} \quad \ldots\ldots(7)$$
$$\text{Cos } \beta = OB/OC$$
$$\text{Cos } \alpha = OD/OC$$
$$\text{Cos } \alpha = \text{Cos } (45° - \beta) = \cos 45° \cos \beta + \sin 45° \sin \beta = 0.707 (\cos \beta + \sin \beta) \quad \ldots\ldots(8)$$

Also,

$$\text{Cos } (\alpha + 2\beta) = \cos (45° + \beta) = 0.707 (\text{Cos } \beta - \sin \beta) = OH/OG = OH/OC \quad \ldots\ldots(9)$$

$OG = OC$ because $\beta = -\beta$

$$OD = OC \times 0.707 (\cos\beta + \sin\beta) \quad \ldots\ldots(10)$$

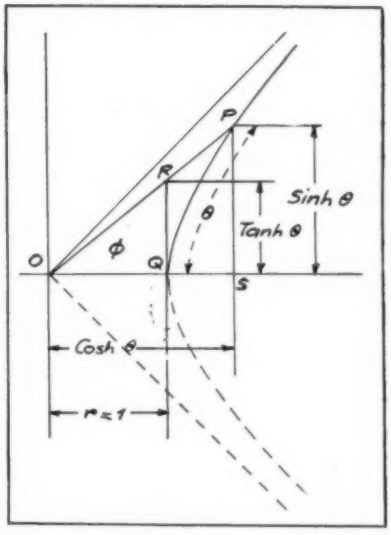


Fig. 10. Diagram illustrating the hyperbolic functions.

$$OH = OC \times 0.707 (\cos\beta - \sin\beta) \quad \ldots\ldots(11)$$

Adding (10) and (11),

$$OD + OH = 1.414 \times OC \cos \beta = \sqrt{2}.OC.\cos \beta = \sqrt{2} \times OC \times OB/OC = \sqrt{2}.OB \quad \ldots\ldots(12)$$

$$\text{Therefore, } (OD + OH)/2 = OB/\sqrt{2} = \cosh \theta \quad \ldots\ldots(13)$$

Subtracting,

$$OD - OH = 1.414.OC. \sin \beta = \sqrt{2}.OC.CB/OC$$

$$\text{Therefore, } (OD - OH)/2 = CB/\sqrt{2} = \sinh \theta \quad \ldots\ldots(14)$$

Now $\theta/2$ = area COA/r^2 = area $COA/2$

θ = area COA

= Area CQOD + area QCAP — area AOP — area OCD

= xy + area QCAP — $(xy/2)$ — $(xy/2)$

= area QCAP $\quad \ldots\ldots(15)$

Therefore,

$$\theta = \int_x^1 y.dx \quad \text{or, since } y = 1/x,$$

$$= \int_x^1 dx/x = [\log_e x]_x^1 \quad \ldots\ldots(16)$$

$$= \log_e 1 - \log_e x = \log_e (1/x) = \log_e y \quad \ldots\ldots(17)$$

and $\varepsilon^{\theta} = y$, OD $= \varepsilon^{\theta}$, OH $= \varepsilon^{-\theta}$

$(OD + OH)/2 = (\varepsilon^{\theta} + \varepsilon^{-\theta})/2$
$= \cosh \theta$ .....(18)

$(OD - OH)/2 = (\varepsilon^{\theta} - \varepsilon^{-\theta})/2$
$= \sinh \theta$ .....(19)

$\tanh \theta = \sinh \theta / \cosh \theta$
$= (\varepsilon^{\theta} - \varepsilon^{-\theta})/(\varepsilon^{\theta} + \varepsilon^{-\theta})$ .....(20)

Expanding ε^{θ} by Maclaurin's theorem,

$\varepsilon^{\theta} = 1 + \theta + \theta^2/1.2 + \theta^3/1.2.3 +$ . . etc. and

$\varepsilon^{-\theta} = 1 - \theta + \theta^2/1.2 - \theta^3/1.2.3 +$ . . etc.

Then $(\varepsilon^{\theta} - \varepsilon^{-\theta})/2 = \sinh \theta$
$= \theta + \theta^3/1.2.3 +$
$\theta^5/1.2.3.4.5 +$ .....(21)

and $(\varepsilon^{\theta} + \varepsilon^{-\theta})/2 = \cosh \theta$
$= 1 + \theta^2/1.2 + \theta^4/1.2.3.4 +$ ..(22)

Adding,
$\cosh \theta + \sinh \theta$
$= (\varepsilon^{\theta} + \varepsilon^{-\theta} + \varepsilon^{\theta} - \varepsilon^{-\theta})/2$
$= \varepsilon^{\theta}$ .....(23)

Subtracting,
$\cosh \theta - \sinh \theta$
$= (\varepsilon^{\theta} + \varepsilon^{-\theta} - \varepsilon^{\theta} + \varepsilon^{-\theta})/2$
$= \varepsilon^{-\theta}$ .....(24)

Multiplying (23) and (24),
$\cosh^2 \theta - \sinh^2 \theta = \varepsilon^0 = 1$ .....(25)

Squaring $(\cosh \theta + \sinh \theta)$,
$\cosh^2 \theta + 2 \cosh \theta . \sinh \theta +$
$\sinh^2 \theta = \varepsilon^{2\theta}$

and $\cosh^2 \theta + \sinh^2 \theta = \varepsilon^{2\theta} -$
$2(\varepsilon^{\theta} + \varepsilon^{-\theta})/2 \times (\varepsilon^{\theta} - \varepsilon^{-\theta})/2$
$= (\varepsilon^{2\theta} + \varepsilon^{-2\theta})/2$, or
$\cosh^2\theta + \sinh^2 \theta = \cosh 2\theta$.....(26)

In the equation $\sinh \alpha \cosh \beta + \sinh \beta \cosh \alpha$,

$\sinh \alpha \cosh \beta$
$= 1/2 \ (\varepsilon^{\alpha} - \varepsilon^{-\alpha}) \times 1/2(\varepsilon^{\beta} + \varepsilon^{-\beta})$
$= 1/4(\varepsilon^{\alpha}\varepsilon^{\beta} - \varepsilon^{-\alpha}\varepsilon^{\beta} + \varepsilon^{\alpha}\varepsilon^{-\beta} - \varepsilon^{-\alpha}\varepsilon^{-\beta})$

$\sinh \beta \cosh \alpha$
$= 1/2(\varepsilon^{\beta} - \varepsilon^{-\beta}) \times 1/2 \ (\varepsilon^{\alpha} + \varepsilon^{-\alpha})$

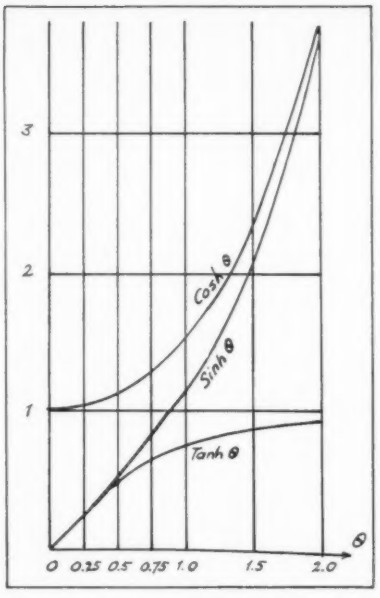


Fig. 11. Graph of values of sinh θ, cosh θ, and tanh θ.

Therefore, $\sinh \alpha \cosh \beta + \sinh \beta \cosh \alpha$
$= (1/4) \ [2\varepsilon^{(\alpha+\beta)} - 2\varepsilon^{-(\alpha+\beta)}]$
$= (1/2) \ [\varepsilon^{(\alpha+\beta)} - \varepsilon^{-(\alpha+\beta)}]$
$= \sinh (\alpha + \beta)$ .....(27)

In the same way it can be proved that
$\sinh (\alpha - \beta) = \sinh \alpha \cosh \beta -$
$\sinh \beta \cosh \alpha$
$\cosh (\alpha + \beta) = \cosh \alpha \cosh \beta +$
$\sinh \alpha \sinh \beta$
$\cosh (\alpha - \beta) = \cosh \alpha \cosh \beta -$
$\sinh \alpha \sinh \beta$
$\cosh jx = (1/2)(\varepsilon^{jx} + \varepsilon^{-jx})$
But $\cos x = (1/2)(\varepsilon^{jx} + \varepsilon^{-jx})$
Therefore, $\cos x = \cosh jx$.....(28)

Similarly, $\sin x = (\varepsilon^{jx} - \varepsilon^{-jx})/2j$
But $\sinh jx = (\varepsilon^{jx} - \varepsilon^{-jx})/2$
Therefore, $\sin x = (\sinh jx)/j$, or
$j \sin x = \sinh jx$.....(29)
$1/2[(\varepsilon^{jx} + \varepsilon^{-jx}) + (\varepsilon^{jx} - \varepsilon^{-jx})] = \varepsilon^{jx}$
and
$1/2[(\varepsilon^{jx} + \varepsilon^{-jx}) - (\varepsilon^{jx} - \varepsilon^{-jx})] = \varepsilon^{-jx}$
Therefore,
$\cos x + j \sin x = \cosh jx +$
$\sinh jx$ .....(30)
Also, $\cos x - j \sin x = \cosh jx -$
$\sinh jx$ .....(31)
$\cos jx = 1/2(\varepsilon^{jjx} + \varepsilon^{-jjx})$
$= 1/2(\varepsilon^{-x} + \varepsilon^{x})$
$= 1/2(\varepsilon^{x} + \varepsilon^{-x})$
$= \cosh x$ .....(32)

Similarly,
$\sin jx = (\varepsilon^{jjx} - \varepsilon^{-jjx})/2j$
$= (\varepsilon^{-x} - \varepsilon^{x})/2j$
$= -1(\varepsilon^{x} - \varepsilon^{-x})/2j$
$= j^2(\varepsilon^{x} - \varepsilon^{-x})/2j$
$= (1/2)j(\varepsilon^{x} - \varepsilon^{-x})$
$= j \sinh x$.....(33)

Taking the trigonometrical formula, $\sin(\alpha + \beta) = \sin \alpha \cos \beta + \sin \beta \cos \alpha$, and substituting imaginary angles $j\alpha$ and $j\beta$ for α and β,
$\sin(j\alpha + j\beta) = \sin j\alpha \cos j\beta +$
$\sin j\beta \cos j\alpha$
$= j \sinh \alpha \cosh \beta +$
$j \sinh \beta \cosh \alpha$; and
$\sinh (\alpha + \beta) = \sinh \alpha \cosh \beta + \sinh \beta \cosh \alpha$, which was proved before in a different manner.

If $\alpha = \beta$, $\sinh 2\alpha = 2 \sinh \alpha \cosh \beta$ .....(34)

If in the expression, $\cosh (\alpha + \beta) = \cosh \alpha \cosh \beta + \sinh \alpha \sinh \beta$, $\alpha = \beta$,
$\cosh 2\alpha = \cosh^2 \alpha + \sinh^2 \alpha$.....(35)
Cosh nu $= (\varepsilon^{nu} + \varepsilon^{-nu})/2$
and $\sinh nu = (\varepsilon^{nu} - \varepsilon^{-nu})/2$

(Concluded on page 15)

Fig. 12. Expression of a hyperbolic angle in terms of exponentials.

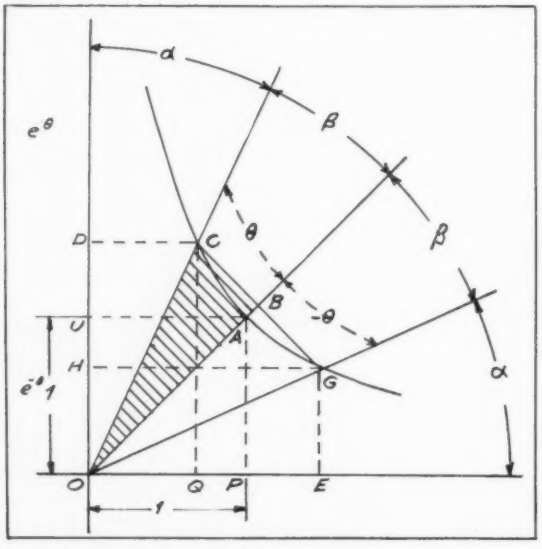
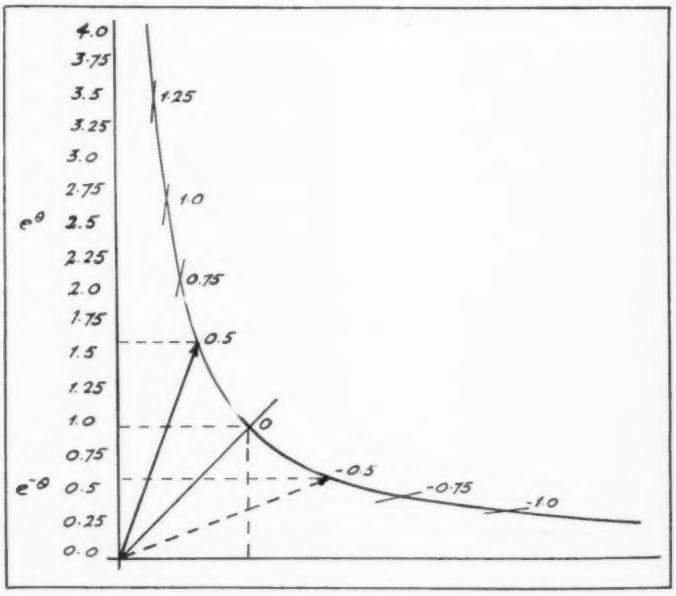


Fig. 13. Calibration of a rectangular hyperbola in hyperbolic radians.



HOW THE STROMBERG-CARLSON 2-10 SYSTEM WORKS -

SMALL BUSINESSES DELIGHT IN THIS ECONOMICAL P.B.X. SERVICE

The
Stromberg-Carlson
2-10 SYSTEM

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HERE IS A SYSTEM with 6 LINES AND 2 TRUNKS The Stromberg-Carlson 2-6 SYSTEM

Compact Relay Cabinet Used With Stromberg-Carlson 2-10 and 2-6 Systems

The same compact type of steel cabinet is used to house the relays for both the Stromberg-Carlson 2-10 and 2-6 systems. It can be placed out of sight in the basement or clothes closet, and yet be easily accessible for servicing.

The system is very similar to the Stromberg-Carlson 2-10 system, the chief difference being that it has only six lines and two Manual Exchange trunks, and the push-button arrangement.

If your sales department must [illegible] of country estates, theaters, schools, hospitals, armories, clubs, insurance offices, railroad [illegible], in your business, you will find many places where your company can earn additional profits by the installation of one of these two systems.

STROMBERG-CARLSON TELEPHONE MFG. CO.

Stromberg-Carlson

MAKERS OF VOICE TRANSMISSION AND VOICE RECEPTION APPARATUS FOR FORTY-FIVE YEARS

(Concluded from page 12)

Also $\varepsilon^u = \cosh u + \sinh u$ (see formula 23)

$\varepsilon^{-u} = \cosh u - \sinh u$ (see formula 24)

Therefore, $\cosh nu + \sinh nu$
$= (\varepsilon^{nu} + \varepsilon^{-nu} + \varepsilon^{nu} - \varepsilon^{-nu})/2$
$= \varepsilon^{nu}$
$= (\varepsilon^u)^n$
$= (\cosh u + \sinh u)^n$
or $(\cosh u + \sinh u)^n = \cosh nu + \sinh nu$ .....(36)

In the same way it can be proved that $\cosh nu - \sinh nu$ is $(\varepsilon^{-u})^n$ and $(\cosh u - \sinh u)^n = \cosh nu - \sinh nu$ .....(37)

There are other results which will be found useful but they can be considered as they arise.

In Fig. 13 the hyperbolic curve $xy = 1$ is drawn. The projection of any point $\varepsilon^{\pm\theta}$ on the Y axis onto the hyperbola cuts that curve at a point $\pm\theta$ hyperbolic radians. Since the rectangular hyperbola meets its assypmtotes at infinity, the circular angle can never exceed 45°.

Also, whereas one circular radian is exactly the same length as another in the same circle, the same statement does not apply to the hyperbolic radian. The lengths of the arc increase while the circular movements of the generating vector decrease. Its circular or quadrature motion decreases while its in phase or stretching movement increases rapidly. There can be no unit hyperbolic radian as the unit varies with the circular angle from which it starts.

The mathematical treatment of the infinite line: In Fig. 14 A-B is a line of indefinite length having series resistance r ohms per unit length and shunt conductance g mhos in the same length. The differential equations giving the voltage and current at any point i along the line can be established as follows:

$-dv = ir.dx$ or $dv/dx = -ir$....(1)

$-di = vg.dx$ or $di/dx = -vg$....(2)

Differentiating,

$d^2v/dx^2 = -r.di/dx = rg.v$ .....(3)

$d^2i/dx^2 = -g.dv/dx = rg.i$ .....(4)

Substituting i/R for g in (3) and (4)

$d^2v/dx^2 = (r/R).v$ and

$d^2i/dx^2 = (r/R).i.$

Writing a^2 for (r/R),

$d^2v/dx^2 = a^2v$ .....(5)

and $d^2i/dx^2 = a^2i$ .....(6)

Therefore, $d^2v/dx^2 - a^2v = 0$ .....(7)

The solution to this equation is

$v = Ce^{ax} + De^{-ax}$ .....(8)

Note: $dv/dx = aCe^{ax} - aDe^{-ax}$

$d^2v/dx^2 = a^2(Ce^{ax} + De^{-ax})$
$= a^2v$

$i = -(1/r).dv/dx$
$= -(a/r)(Ce^{ax} - De^{-ax})$
$= -(1/\sqrt{Rr})(Ce^{ax} - De^{-ax})$..(9)

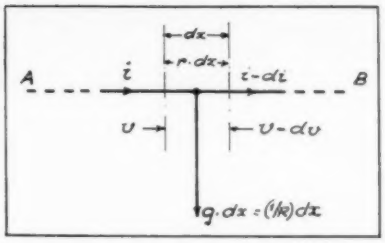


Fig. 14. Infinitesimal portion of a long, single line with earth return.

Writing R_o for $\sqrt{Rr}$,

$i = -(Ce^{ax} - De^{-ax})/R_o$ .....(10)

If V and I are the voltage and current at the sending end of the line where $x = 0$, then from (8)

$V = C + D$ .....(11)

and $IR_o = -C + D$ .....(12)

Adding (11) and (12),

$(V + IR_o)/2 = D$. Subtracting,

$(V - IR_o)/2 = C$.

Therefore,

$v = [(V - IR_o)/2]\varepsilon^{ax} + [(V + IR_o)]\varepsilon^{-ax}$
$= [V(\varepsilon^{ax} + \varepsilon^{-ax})/2] - [IR_o(\varepsilon^{ax} - \varepsilon^{-ax})/2]$
$= V \cosh ax - IR_o \sinh ax$....(13)

$IR_o = -(C\varepsilon^{ax} - D\varepsilon^{-ax})$
$= -(V - IR_o)\varepsilon^{ax}/2 - (V + IR_o)\varepsilon^{-ax}/2$
$= -V(\varepsilon^{ax} - \varepsilon^{-ax})/2R_o + IR_o(\varepsilon^{ax} + \varepsilon^{-ax})/2R_o$ and

$i = I \cosh ax - (V/R_o) \sinh ax$....(14)

If the receiving end is grounded, v in (13) is 0 and

$V \cosh ax = IR_o \sinh ax$ from which,

$V/I = R_o(\sinh ax/\cosh ax)$,

or $R_x = R_o \tanh ax$.....(15)

which is the resistance of the line at the sending end.

If the receiving end is disconnected or freed, i in (14) is 0 and

$I \cosh ax = (V/R_o) \sinh ax$

$V/I = R_o (\cosh ax/\sinh ax)$

and the resistance at the sending end is

$R_f = R_o/\tanh ax$ .....(16)

$R_f \times R_x = R_o^2 (\tanh ax/\tanh ax)$
$= R_o^2$

and $R_o = \sqrt{R_f \times R_x}$

which has already been proved.

The current at the sending end with the line grounded is

$I = V/R_o \tanh ax = V \coth ax/R_o$

(Note: $\coth ax = 1/\tanh ax$).

The current at the receiving end is

$i = I \cosh ax - (V/R_o) \sinh ax.$

Substituting the value for I above,

$i = (V/R_o)$ $(\cosh ax \times \cosh ax/\sinh ax) - (V/R_o) \sinh ax$
$= (V/R_o)$ $(\cosh^2 ax - \sinh^2 ax)/\sinh ax$
$= V/(R_o \sinh ax)$.....(17)

The ratio $i/I = (V/R_o \sinh ax)/(V \coth ax/R_o)$
$= 1/\cosh ax$.....(18)

If ax is very large, $\cosh ax$ reduces to $\varepsilon^{ax}/2$ since ε^{-ax} becomes very small. i/I then becomes

$1/(\varepsilon^{ax}/2)$
$= 2\varepsilon^{-ax}$

Taking the expressions $R_x = R_o \tanh ax$ and $R_f = R_o \coth ax$,

$R_x/R_f = \tanh^2 al$, or

$\sqrt{R_x/R_f} = \tanh al$, where $x = l$, the length of the line.

When l is known, a can be obtained and the conductor resistance per mile is given by the expression $r = a.R_o$. The insulation resistance per mile $R = R_o/a$.

Note: $a = \sqrt{r/R}$ and $R_o = \sqrt{rR}$

Therefore,

$r = Ra^2$ and $R = R_o^2/r$, from which

$r^2 = R_o^2 a^2$ and $r = R_o a$

while $R = R_o^2/R_o a = R_o/a$.

Example: A line 800 miles in length has a measured sending-end resistance of 2,951 ohms with the far end to ground, and 3,049 ohms when the distant end is freed.

$R_o = \sqrt{2{,}951 \times 3{,}049} = 2{,}999$ ohms.

$\tanh al = \sqrt{(2{,}951/3{,}049)} = 0.9835$

and $al = 2.4$

$a = 2.4/800 = 0.003$

Therefore r, the conductor resistance per mile, is $2{,}999 \times 0.003 = 8.997$ ohms; and R, the insulation resistance per mile, is 1×10^6 ohms or one megohm.

It is occasionally useful to have expressions for half angles $\theta/2$.

Since $\cosh 2\theta = \cosh^2\theta + \sinh^2\theta$, and $\cosh^2\theta - \sinh^2\theta = 1$, then,

$\cosh \theta = \cosh^2(\theta/2) + \sinh^2(\theta 2)$
$= 1 + 2 \sinh^2 (\theta/2)$.....(1)

and $\sinh(\theta/2)$
$= \sqrt{(1/2)(\cosh \theta - 1)}$ .....(2)

$\cosh (\theta/2)$
$= \sqrt{(1/2)(\cosh \theta + 1)}$ .....(3)

$\sinh^2(\theta/2)/\cosh^2(\theta/2) = \tanh^2(\theta/2)$
$= (\cosh\theta - 1)/(\cosh\theta + 1)$ .. (4)

Multiplying the numerator and denominator by $(\cosh \theta + 1)$,

$\sinh^2(\theta/2)/\cosh^2(\theta/2)$
$= (\cosh^2\theta - 1)(\cosh \theta + 1)^2$

Therefore, $\sinh(\theta/2)/(\cosh \theta/2)$
$= (\sinh \theta)/(\cosh \theta + 1)$.....(5)

If the numerator and denominator of (4) are multiplied by $(\cosh \theta - 1)$, then,

$(\cosh\theta - 1)^2/(\cosh^2\theta - 1)$ and

$\tanh (\theta/2) = (\cosh \theta - 1)/(\sinh \theta)$ .....(6)

REA Cooperatives Not Subject to Utah Commission

Rural electric cooperatives in Utah are not public utilities subject to the jurisdiction of the state public service commission. This was the unanimous decision of the Utah Supreme Court, setting aside a commission order holding a cooperative, financed by the federal REA, to be subject to regulation.

Nebraskans Take "Time Out" to Study Their Business

By H. T. DOBBINS

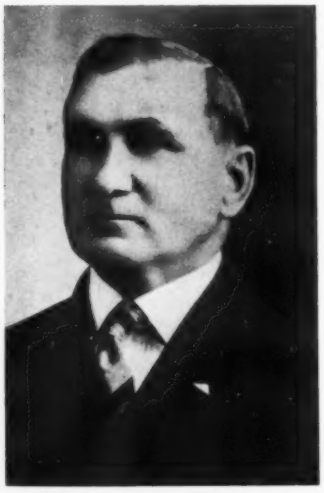
WITH AN EXCELLENTLY-PLANNED program to guide the discussions, Nebraska telephone men and women gleaned many new ideas and thoughts during their annual convention last week. Subjects discussed by able speakers included the wage-hour law, farmers' telephones, inductive interference, unemployment compensation and fire insurance rate

ATTENDANCE at the 41st annual convention of the Nebraska Telephone Association, held at Kearney on April 9 and 10, broke all records by a small margin, while more than 300 were present at the annual banquet which closed the meeting. Veterans who have been in attendance at many of the annual gatherings of telephone men united in praising Secretary George M. Kloidy for the high-class program offered and the local committee, headed by A. B. Clark, general manager of the Nebraska Continental Telephone Co., for the excellence of the entertainment.

A great deal of interest was accorded the presentation by Walter F. Scherer, of Denver, senior attorney of the Federal Department of Labor (who substituted for Russell L. Kingston, supervisor inspector in charge of the wages and hours law) of the program and policies of that bureau.

Among the resolutions adopted at the close of the convention was one pointing out that as the wage and hour law was originally drawn, it placed a burden on the telephone industry which many small companies were unable to bear; that the national association felt it necessary to send a committee to Washington to work for an amendment that would alleviate the situation and permit small companies to continue in business. Through the "splendid efforts of this committee Congress did give that relief by passing an amendment exempting from the provisions of the act switchboard operators in exchanges having less than 500 stations," the resolution recited.

Sincere thanks and appreciation were extended to the national association committee through its chairman, John H. Agee, for being instrumental in securing the amendment. Nebraska Senators and Congressmen were also thanked for the support they gave.



C. L. KELLY, of North Bend, retiring president of the Nebraska association, cited the amendment to the Wage-Hour Act secured by the Independent telephone industry as proof that money spent for support of state and national associations is money well spent.

The convention elected A. B. Clark, general manager of the Nebraska Continental Telephone Co., with headquarters at Columbus, as president for the next year, and D. M. Davis, of the Hamilton County Farmers Telephone Association of Aurora, as vice-president. Secretary George M. Kloidy was unanimously reelected secretary.

Associations Try to Serve Their Members Well

In opening the convention President C. L. Kelly, of North Bend, called attention to the fact that the association seems to prosper regardless of existing economic conditions. In the early days the non-member company was a great problem. Today the records show that comparatively few eligible companies remain outside the fold of the organization.

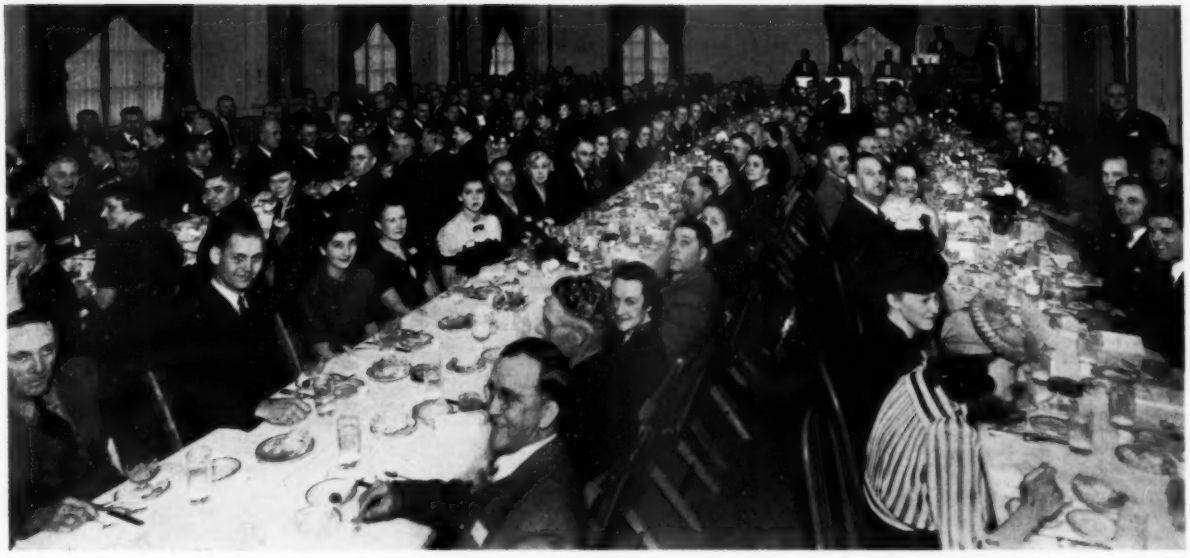
Mr. Kelly said that if any proof were needed to show that money spent for support of state and national associations is money well spent, one need point only to the successful effort made by the associations to secure amendments to the wage and hour law that saved the smaller companies from practically extinction. Many other instances might be cited where, because of association efforts, incalculable harm to Nebraska companies has been prevented.

In his annual report Secretary Kloidy reviewed the efforts made by the state and national associations to secure favorable amendment to the wage and hour law. He referred to the fine work done by the national committee headed by John H. Agee, and the excellent support it received from the telephone field.

The state legislative session, Mr. Kloidy said, was the longest in the history of Nebraska. Only eight bills of the 523 introduced would have more or less affected the telephone industry. Some of them gave the association representatives quite a headache before their final disposition. All that were objected to by the association were indefinitely postponed.

Two interesting and well-attended district conferences, one at North Bend and one at Arapahoe, were held last year. In addition the secretary called during the summer on most of the affiliated companies. He was accompanied by John H. Schnell, chief accountant for the Nebraska State Railway Commission, who availed himself of the opportunity to iron out accounting matters which arise and which are not easily adjusted by correspondence.

The final draft of the proposed new system of accounts for Class C and D telephone companies was approved toward the end of the year by the association's accounting committee, consisting of I. J. Devoe, D. E. McGregor, D. M. Davis, C. L. Kelly, V. Bellows and the secretary. On December 12,



This view of the banquet at the Nebraska convention last week shows only about half of the crowd attending, owing to the impossibility of taking a picture that would include the whole room. However, this portion of the party indicates that the evening was gay and enjoyable. At the extreme right, standing, is Geo. M. Kloidy, secretary of the Nebraska association.

the state railway commission formally adopted this new system which is now in effect.

As it defines Class C companies as those having average annual operating revenues exceeding $25,000 and not exceeding $50,000 and defines Class D companies as those having average annual earnings of from $15,000 to $25,000, only a few companies will be affected. The main feature of the new system is the elimination of the combined maintenance and depreciation allowance, to the continuance of which the committee has vigorously objected.

The association closed the year with 16 associate and 97 company members, representing 188,900 stations, a gain of 3 companies and 632 stations.

We Should Be Most Concerned About the Future

Dr. Herbert L. Cushing, president of the Kearney State Normal, said that when we undertake to talk about trying times we need to realize that what constitutes trying times for one individual or one group may seem to be remotely connected with things which are involved in trying times for others. Back of it all, however, there must be a realization that there is a close relationship and that no single factor is involved more than the problem of bread and butter.

Regardless of varying political beliefs, said the speaker, we would probably agree that what were considered radical proposals in 1896, when the country was at fever heat over issues raised, would pale into insignificance when compared with many of the rather universally accepted achievements of the New Deal.

Dr. Cushing said that it makes relatively little difference what we think of the program which was inaugurated eight years ago, and so far as the future is concerned it is not necessary to debate whether what was done was necessary. It is the future which should most concern men. If all that the New Deal has done were repealed, the problems would be still with us and there is no assurance that they would not be multiplied.

Our representative American democracy will not endure simply as the result of our constant voicing of patriotic, high-sounding phrases. With all due respect to those who insist that there are still great frontiers to be explored, it seems to be a generally accepted idea that either business or industry must find a way to furnish employment for men and women who are anxious to work or else the government must find employment. However much we believe in rugged individuality, it is a thing of the past.

Dr. Cushing said that it is not sufficient to wait until depressions are upon us to attempt elaborate plans to find a way out. It is necessary that we gather facts in advance in order to be able to act intelligently. Somewhere along the way there is a point where government and business, industry and agriculture, labor, the employer and the consumer can work together in such a fashion as to permit a reasonable degree of prosperity for all.

Walter F. Scherer, senior attorney of the federal Department of Labor, said that the wages and hours division believes that the law it is called upon to enforce is a just and fair law and that its observance will be a matter of course when it is widely understood. It is not only a labor law but social legislation developed to fill a great social need for fair standards in hours and wages. These standards are necessary because today no business operates in a vacuum.

Aim of the Wage and Hour Law

After outlining the scope of the act, Mr. Scherer said that the main problem of the division is to steer a proper course between too great leniency and unjustified strictness. Generally speaking, it covers business engaged in interstate commerce or in the production of goods for interstate commerce. This includes typically, but not exclusively, those engaged in the telephone industry. He said he did not think that anyone would quarrel with an annual wage of $655.20, which is what the present provisions guarantee.

After calling attention to various devices used to escape payment of overtime, Mr. Scherer said it was necessary to adopt reasonable rules. All time is counted during which an employe is required to be on duty, whether waiting time or in attendance at employer-sponsored meetings for the purpose of promoting sales or otherwise contributing to the efficiency with which the business is conducted, but there is nothing that requires a time

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clock or any specific fashion for employers to keep their records.

The administrator is given no discretion. He cannot enforce a little bit here and a great deal there and not at all somewhere else. His duty is to enforce the law to the end that the instrumentalities of interstate commerce shall no longer be used to spread poverty and depression among the workers, thus constituting an unfair method of competition, obstructing the flow of interstate commerce and engendering wholesale strife.

Farmers Tell Why Telephones Are Removed

The most novel and interesting feature of the program was the dramatization of the troubles of telephone companies in creating farm revenues staged by D. E. McGregor, president of the Nebraska Central Telephone Co., of Gibbon, and former president of the association. He brought with him to the platform three farmers—County Agent Leonard Wenzl, of Buffalo County; Glenn Stafford, Buffalo County A. C. P. chairman, and Walter Frink, A. C. P. committeeman from Gibbon.

Mr. McGregor opened the discussion by asking Mr. Wenzl point blank why the farmers had removed their telephones in recent years. Mr. Wenzl, who has more intimate contact with farmers in that area than any other man, replied that mainly it was because decreased income had forced them to dispense with service. He said that the necessities of life such as food, clothing and cost of transportation come first in farmers' expenditures. Due to low prices and the drouth there was hardly enough received to meet actual necessities for the average farmer.

Mr. Wenzl said that the farmer with no livestock or crops to sell really had little use for a telephone outside of social and emergency calls, and that having had to take chances on so many things the last few years he was also taking chances on being out of touch with help in case of emergencies.

He also stressed the fact that the low price of so many farm commodities, such as lard, were caused by the use of imported oils and other products for shortening by the average city family. Telephone people could help out in increasing revenues by using the best grade of lard, butter and American-raised beet sugar, he stated.

Mr. Wenzl said that 70 per cent of Nebraska's farm income comes from livestock, and that it had been possible to keep the foundation livestock on the farm by the use of sorghum crops. He also brought out the importance of changed methods of farming due to the drouth conditions in his territory and, as an illustration, stated that the preceding afternoon 700 farmers had attended a farm tillage program held north of Kearney. A possibility exists of increasing revenue by raising the standard or quality of eggs and cream on the basis of quality products.

The part that the 4-H club program is having in maintaining interest in

GEO. M. KLOIDY, Lincoln, who was reelected secretary-treasurer of the Nebraska Telephone Association, arranged all details of the excellent program for the annual convention held last week.

farming on the part of the young people was also brought into the discussion. It was shown that civic and commercial clubs would help promote these programs, and that telephone men, as leaders in their communities, should aid for the benefit of their territories.

The discussion between Mr. McGregor and Mr. Stafford brought out the fundamental principles of the A. C. P. program, and that farm income had been increased by facilities it afforded for storage of wheat and corn, thus keeping them off the market when the lowest part of the price cycle was reached. Through this program farmers were getting together and planning their operations in advance, exchanging ideas and otherwise becoming educated to do a better job of farming.

Mr. Stafford said that another fundamental involved preservation of soil fertility for future generations. He said that the farmer's overhead did not vary much from year to year, and that he needed a stabilized income just as does the telephone company. This can be secured by a program of orderly marketing.

Mr. McGregor and Mr. Frink, who is a farm telephone subscriber on one of Mr. McGregor's exchanges, went into details on the whole farm program in their vicinity, what it had meant to them individually (Mr. McGregor also operates a farm). Mr. Frink said that farmers who had re-connected their telephones had benefited by the farm program, and their income had been increased to the point where they could again afford this service.

Farmers Must Be Re-sold on Value of Telephone

However, said Mr. McGregor, even with the increased prices, it took some effort to resell these farmers on the value of telephone service, as they had been without it so long that they did not realize what they were missing.

In summing up the reasons for discontinuance and re-connection of telephone service, it was agreed by all four in the panel discussion that the work done by the extension service of the state and the A. C. P. programs had both helped materially to educate the farmers to meet the new conditions brought on by recent drouth years. They also agreed that as the farmers start regaining their earning capacity, they need telephone service to carry on their operations, and thus become good prospects. Most of them, however, will have to be resold on its value and the importance of it in conducting their business.

Mr. McGregor said that his company had reclassified all of its non-subscriber lists every few months, and those who seemed to be prospects were put on the working list and personally interviewed.

Another method used by his company is to take down the names of all persons whom others had been trying to call and then telling them in a kindly way that someone was very much disappointed when they could not be reached by telephone. Sometimes two or three letters were sent to these parties, after which they were personally interviewed.

These methods had been found to be effective in securing re-connects, but constant sales efforts are needed if telephone companies are to regain business as farmers become prospects through increased income or changed conditions of operation.

Process of Regulation Evolved the State Commission

Speaking on the general subject of regulation, Secretary George E. Truman of the Nebraska State Railway Commission pointed out that it is not

a new thing and referred to insurance companies. It is necessary that some measure of regulation be established, or continued, he stated, not only for the benefit of the public in matters which have a public interest, but also for the benefit of industry.

A regulatory body is, or should be, interested in seeing that the public has adequate service. In order that existing facilities might continue it is necessary, in many instances, to protect the industry against destructive competition and unfair practices which would render the existing facilities less valuable to the public.

There is no better example of an industry which functions best when it is a monopoly than the telephone industry. If two or three telephone companies were operating in the same city, confusion would result and telephone subscribers would be obliged to have two or three services. Hence the public should be protected against such situations so that the monopoly functions in the interest of the public.

"The criticism so currently levelled at regulatory bodies does not require a new conception of the functions of the commissions," said the speaker. "There will always be criticism however fair the commission functions, but for the most part the fair criticism which is today directed at regulatory bodies is against the method with which the laws are administered.

"With fair administration and an understanding of the problems of the industry which is being regulated, regulatory bodies generally can gain and maintain the respect and admiration of the public. Regulatory bodies must not lose sight of the evils for the correction of which they were instituted, and industries regulated must likewise be mindful of the fact that good relations with the public are essential to their success and should cooperate with regulatory bodies to that end."

Operators' Conference Held Separate from Regular Sessions

A new feature of the program was the holding of an operators' conference in connection with but apart from the general sessions. It was attended by 65 operators and chief operators from 35 towns. It was conducted jointly by Miss Melanise Breault, traffic methods supervisor of the Lincoln Telephone & Telegraph Co., and Miss Ellen Grosbeck, district instructress for the Northwestern Bell Telephone Co., of Grand Island. It was presided over by C. S. Copps, district traffic superintendent of the Northwestern Bell Telephone Co.

The meeting was opened with the showing of two interesting films. The first, entitled "A New Voice for Mr. X," was a demonstration of proper telephone usage and pleasing voice tones. The second film portrayed the employment and training of toll student operation, showing the various steps from the student's application for employment up to the completion of the training as a finished toll student operator. This film was furnished by Royal S. Brewster, traffic superintendent for the Lincoln Telephone & Telegraph Co., taken in the offices of his company.

Sixty-five operators representing 35 towns attended the operators' conference held during the Nebraska convention last week. This picture was taken by R. S. Brewster, general traffic superintendent of the Lincoln Telephone & Telegraph Co., Lincoln.

Miss Jessie Stodard of the Hamilton County Farmers Telephone Association, gave a report on problems encountered by chief operators and suggestions for their proper solution. This furnished several points that were later covered in a general group discussion.

Miss Grosbeck also explained the many advantages of the customer-held service from the standpoint of tributary and toll center offices as well as from the standpoint of the subscriber.

Coordination Between Power and Telephone Systems

In the talks and demonstrations by C. W. Minard, chief engineer of the Nebraska Power Co., and H. R. Huntley of the American Telephone & Telegraph Co., the history of coordination between power and telephone systems was reviewed. It was pointed out that this problem arose at the very start of the electric light and telephone industries. By 1885 it had become so important that a meeting of electric light people was called in Chicago in that year to see if there were not some way in which this "great conflict" between the telephone companies and the electric light companies could be adjusted.

Theodore N. Vail (then president of the newly-formed American Telephone & Telegraph Co.) sent a representative with a letter to that meeting which laid the foundation for a cooperative approach to the problem.

In essence this cooperative approach involved simply the acceptance by both sides of the idea that the other fellow has a right to live, the admission that there may be merit in his position, and the acceptance of responsibility by both sides and the idea of pooling their abilities.

By 1920 it became apparent that the cooperative approach was the most advantageous and it was decided to set up a formal joint organization between the National Electric Light Association and the Bell System to facilitate working out mutual problems and to secure the technical information needed in this connection. This organization issued "Principles and Practices" as a guide to the member companies of the N.E.L.A. and associated companies of the Bell System based on the fundamental principle that the public interest is paramount.

A joint subcommittee on development and research was set up to ascertain the facts involved in these problems, and this group—which is still actively at work—has produced what is generally recognized to be the most comprehensive and authoritative literature on the subject available anywhere.

In the demonstrations themselves the fundamentals of electric and magnetic induction were first reviewed. The general factors affecting power system influence—that is, balance and wave shape—were demonstrated. Particular attention was given to the inductive influence of rural power lines—it being shown that the inherent differences in influence between extensive delta uni-grounded and multi-grounded neutral systems were relatively small as compared to the differences associated

(Please turn to page 33)

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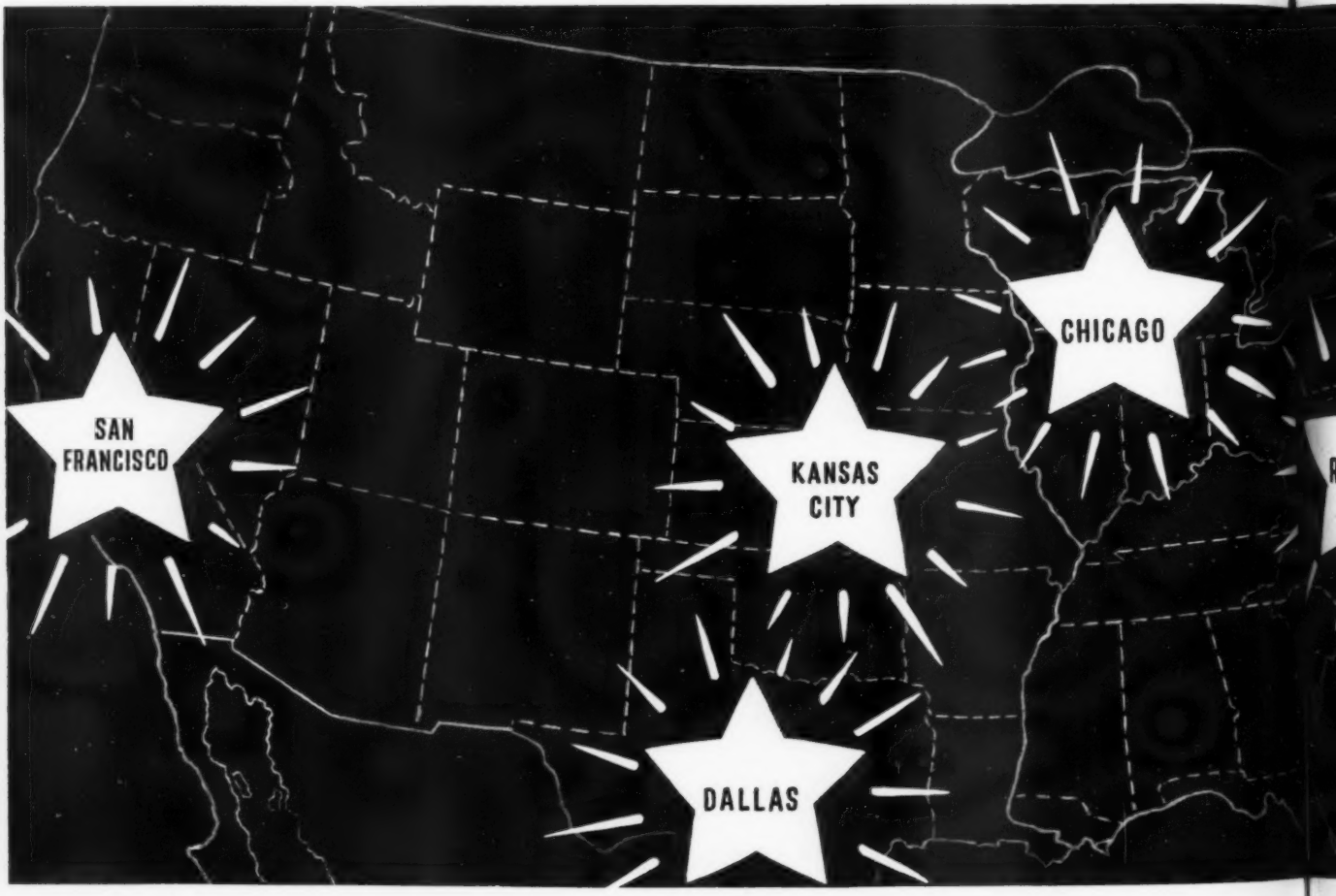

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RARE GAS RELAYS

Eliminate Noise on Telephone Lines

By D. H. TOWNSEND
Manager, Churchill County Telephone & Telegraph System, Fallon, Nev.

***WHERE POWER LINES** are involved, any direct ground will cause noise on telephone lines. This article tells how one telephone manager utilized rare gas relays to advantage because they prevent induction noise and render the lines free from grounds except when ringing signals are on line*

USING THE WORDS of a popular contributor to TELEPHONY, one does "Wonder Why" the average Independent exchange is slow to, or will not, take advantage of any item called new or modern.

Three years ago last month a product was first advertised as: "Something Entirely New in Telephony." New—yet it was not. The manufacturer had been supplying items for the telephone industry for more than 30 years. The product advertised as "Entirely New" had been in actual service for months before any advertising appeared. No manufacturer so long established would risk his reputation on an inferior product, nor one that would not be a benefit to the industry. Yet today, in many exchanges this product could be put to work to the great advantage of the exchange.

The Rare Gas Relay Is a Simple Arrangement

The product referred to is the rare gas relay—a simple electronic device, having no moving parts, requiring no adjustments. Easily installed in any position, it has a lifespan equalling any piece of telephone equipment. It is, as will be seen from Fig. 1, nothing more than a glass tube containing two metal plates. Sealed in the glass tube or envelope is a combination of rare gases.

It is ruggedly built—note how the terminal wires and sealing stems form solid supports for the small plates, assuring correct spacing. Compared with a mechanical relay, this means that the air-gap, armature travel, spring tension, etc., are permanently built-in and sealed at the factory. The glass tube is protected on the outside by a heavy bakelite shell and metal terminal ends.

Operation of the rare gas relay is as simple as the relay itself. By a relay, we mean a mechanical device that will at certain voltages or currents pull up its armature and close a circuit, passing current through its contacts. That is exactly what the glass tube does. The combination of the special metal plates—their spacing and the gases being all built-in at the factory to operate—become conducting and pass ringing current, at 60 volts or more.

Below this voltage the tube does not function—no current passes—it's open. Nothing is bridged either across the line or to the ground, whereas with the mechanical relay the coil windings would be bridged, contacts might stick or adjustments would need to be made frequently. The minute the ringing current stops, the tube "clears itself."

All of us know that where power lines are involved, even if miles away from telephone lines, *any* direct ground will "noise up" the telephone line, causing it to hum or squeal. Even divided ringing lines, with a condenser and the highest impedance ringers known, are noisy due to the fact that the condenser alone passes all sorts of alternating current. True the condenser is open as far as direct current is concerned, yet it offers free passage for alternating current induction noises, audio frequencies, whereas the rare gas relay does not.

Therefore, when we install rare gas relays our lines are free from grounds except during the actual time the ringing signals are on the line. Voice frequency currents are not by-passed to the ground or lost in bridged coils, and audio frequency currents can not come back to the line.

The writer has no data as to actual life tests of the rare gas relay; it may be 1,000 hours, such as an ordinary light globe, it may be much less. Judging from other electronic devices, he personally assumes a safe margin of 300 hours or more of actual operation. By actual operation is meant the time the relay is actually passing current to the ringer. Even on a very busy line this will not total more than 6 hours in a whole year. In fact, the relay should outlive the ringer and other parts of the telephone, whose original cost is equal to or more than the relay.

Manager Finds Rare Gas Relays Pay for Themselves

The writer was using rare gas relays months before they were introduced commercially. He has found that they pay for themselves—something few other telephone parts will do. They improve transmission greatly in many ways. They save operators' time and they keep subscribers satisfied.

Take the Fallon exchange, as an example: Outside of being municipally-owned it is no different from a great many others of equal or larger size where gas relays could be used. We have common battery service in town, magneto service on the rurals; about equally divided as to "city" and "country" telephones. Power lines are stretched throughout the exchange area.

There are eight to ten subscribers on each code-ringing rural line—the farmer calls them "Eight to ten-bell lines." Ring any subscriber and all receivers go off the hook. You know the eavesdropper runs down dry cells

faster than the talker; if you do not realize what he does to transmission, the following table may give you a clearer understanding:

Number of Eavesdropper Receivers Off the Hook	Relative Amount of Voice Current Reaching Called Subscriber
0	100 per cent
1	50 per cent
2	25 per cent
3	12 per cent
4	6 per cent

All cord circuits are wired for five-party harmonic ringing; automatic on common battery lines. Each calling cord has a reversing key. If we could only use the reversing keys, put in divided ringing on rurals, we could save on dry cells and eliminate much eavesdropping. Ordinary divided ringing with condensers and high impedance ringers would not work, except in isolated cases, due to "power noises."

We had been using "Neon" arresters for years and found they kept our lines clear of grounds; only worked when they were required to work. Why did they not have a big brother? Was there not some device that would function similarly which could be used with divided ringing? Then along came the rare gas relay and we immediately put it to work; now more than one-third of our rural sets are equipped. True we could have used expensive mechanical relays, but the cost of maintaining them and transmission losses were factors to consider.

We started with one line for a test. This line, extending approximately five miles from the office, had ten subscribers, a "ten-bell line." Its loop resistance we knew would just come within the supervisory limits of our cord circuits. If the tubes worked all right we could work the line local battery talk—common battery signal, making it a strictly "one-bell line." Not favoring temporary hook-ups and makeshifts, sets for this line were rewired as per Fig. 2. Then they were tested out in the shop and the ringers were adjusted on an artificial line. The line was changed over and, with but one exception, the original shop adjustments of the ringers are still holding.

Observing this line for three months we noted that even though it paralleled a power line most of its length, we had no power noise while talking. Transmission was greatly improved, each bridged 2,500-ohm set creates a .5 db loss; with none bridged we gained several dbs. We eliminated the eavesdropper, another big transmission gain.

Operators did not have to codering time and again to get the party. Cord supervision lights indicated when the party answered and when the conversation terminated. It was readily apparent that with more lines equipped with automatic divided harmonic ringing, a great saving could be made in operators' time.

We also found that with the line clear of grounds it was easy to keep it clear. Short-circuits, swings, etc., were quickly indicated by the line lamp; tests could be quickly and accurately made with the bridge or voltmeter.

Subscribers on other rural lines commenced requesting the same type of service. It was worth a higher rate; many were willing to pay for it. Even though municipally-owned we have to keep strictly within telephone revenues; therefore, we could not change over all lines at one time. We had to do it a line at a time. So by degrees we now have 150 sets equipped with gas relays.

Again referring to Fig. 2, the 2-mf. condenser can be eliminated. We had some isolated cases where the condenser alone would suffice, simply shorting out the wires to the tube. To have a standard wiring in our sets we have kept the condenser in the circuit. On straight common battery sets we do not make the usual 1-mf. condenser serve for both talking and ringing. We add a 2-mf. for the ringing circuit alone as it passes more ringing current. Sets for the type of service mentioned cost less than magneto sets; one could get them factory wired if so ordered.

Troubles do occur with rare gas relays the same as with any other piece of equipment. A few have developed very high resistance or became "intermittent" after a few weeks' service; but the manufacturer gladly replaced the defectives. Two have been damaged by the subscriber doing carpenter work on the wall next to the set, jarring the tube so much that the sealing tip broke letting out the gas. Possibly this could be avoided with a shorter stem or a mineral wool packing.

Some ringers have required readjusting; ever see a new one that did not require it after the tapper had worn through the black enamel and some of the brass of the gong, thus changing the original clearances? That's no fault of the relay.

Three out of the 150 subscribers kicked on the "one-bell service." They admitted they did not like it because they could not hear other bells ring and did not know when to "rubber-in." The other 147 would not go back to multi-bell lines and winding the telephone to get Central.

By this mid-summer more than half our rurals will be gas-relay-equipped, local battery talk— common battery signaling. Then we will start on the extreme long lines using five-party divided-code

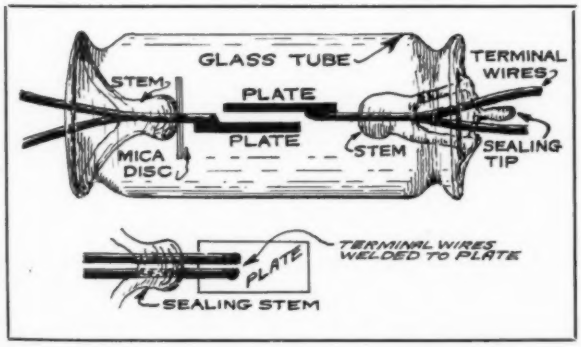

Fig. 1. The rare gas relay is a simple electronic device consisting of a glass tube containing two metal plates. Sealed in the glass tube or envelope is a combination of rare gases.

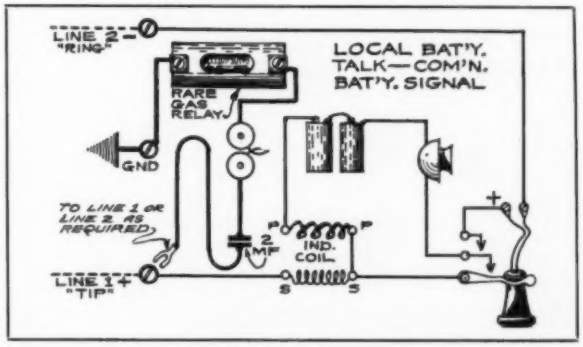

Fig. 2. In testing the rare gas relay for practical use, the sets on a line having ten subscribers were re-wired and tested in the company's shop, and the ringers adjusted on an artificial line.

ringing. A previous article in TELEPHONY (February 19, 1938, "Some Troubles in Small Exchanges") has described the use of the gas relays in this and some other types of service.

Rare gas relays are not a "cure all" for line noise. They will not eliminate tree grounds, bad joints and other unbalanced noise.

Ringing voltages *must* be kept up to standard—remember it requires 60 volts at the relay to make it operate, not 60 volts at the output of the central office ringing machine. We have experienced no ringing trouble on lines extending 12 miles out, including one mile of cable.

Many have hesitated to use rare gas relays due, perhaps, to their apparent high cost; yet they are no more expensive than a ringer or a transmitter. I believe from our experience with them that they pay for themselves.

▼ ▼

Telephone Employment of Last Two Decades Compared

The effect on employment of the volume decline of telephone business during the decade beginning with 1930, caused President Walter S. Gifford of the American Telephone & Telegraph Co., to make an interesting comparison of certain employment conditions in the 1930's with those of the ten-year period, 1920 to 1929 inclusive. In his annual report on the 1939 operations of the A. T. & T. Co., Mr. Gifford commented upon the extraordinary difficulties of the decade just ended by saying:

"The decade beginning with 1920 was a period of substantial and sustained growth. Facilities had to be constructed and personnel recruited and trained in advance to meet the rapidly rising demand for more and more service and to offset a high rate of employment turnover which was experienced by business generally.

During this decade, the number of Bell System telephones increased from 7,575,000 to 15,035,000 and the number of employes of the American Telephone & Telegraph Co. and its principal telephone subsidiaries from 208,000 to 358,000.

The decade beginning with 1930 was one of unprecedented fluctuations in the volume of telephone business, being marked by severe losses in the early part of the period and irregular but substantial gains in the latter part. The decline in volume of telephone business resulted in subnormal construction activities, while personnel recruiting and training requirements and employment turnover reached extremely low levels.

By 1933 there had been a loss of about 2,500,000 telephones, and it was late in 1937 before this loss was made up and, even now, construction work is about half that of 1929. At the end of 1939, the number of employes of the American Telephone & Telegraph Co. and its principal telephone subsidiaries was 259,900.

A most significant item in these comparisons is the number of employes of less than one year of service in various stages of training. At the end of the boom period in 1929, the number was 90,000, and at the end of 1939, 18,000.

The much more experienced and efficient personnel which this difference in the relative proportion of learners reflects, together with the continuing improvement in methods and apparatus, and substantially reduced construction activities, are the major causes of the differences in telephone employment in 1939 in comparison with 1929.

Every effort was made to avoid laying off employes during the depression. Employes were re-assigned to other work, construction work was brought forward, preventive maintenance work was advanced and there was considerable spreading of work.

As a result, the number of layoffs in the 1930's was about one-half as many as in the 1920's. Necessary force adjustments were made largely by not adding employes to fill the vacancies created by voluntary resignations, retirements and deaths."

▼ ▼

Frequency Modulation Testimony at FCC Hearings

In the semi-monthly magazine Broadcasting for April 1 is an article entitled "Birth of Commercial FM This Year Seen." It is a complete review of the testimony during the first eight days' hearings before the FCC on frequency modulation.

The summary of the testimony presented by various experts completely bears out the articles published in TELEPHONY of February 10 and April 13 and written by Arthur L. Albert, professor of communication engineering, Oregon State College.

▼ ▼

March Station Gain of General Telephone Corp.

General Telephone Corp. reports for its subsidiaries a gain of 3,100 company-owned telephones for the month of March as compared with a gain of 2,439 telephones for the month of March, 1939. The gain for the first quarter of 1940 totals 8,186 or 1.63 per cent as compared with a gain of 5,180 telephones or 1.13 per cent for the corresponding period of 1939.

The subsidiaries now have in operation 509,770 company-owned telephones.

▼ ▼

Carl I. Wheat Opens Washington Office

Carl I. Wheat, formerly telephone rate counsel for the Federal Communications Commission, and specialist over many years in public utility and communications legal problems, has announced the opening of offices in the Shoreham Building, Washington, D. C.

Since leaving the FCC staff, Mr. Wheat has been practicing law at San Francisco, Calif., and plans to continue his office in that city. It is understood that among his clients are a number of the larger Independent telephone companies, whose interests he will represent in Washington.

He is the author of numerous articles and reports on regulatory problems, and has acted as consultant for public utilities as well as regulatory bodies and consumer groups.

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Financial News and Data

Annual Report Simplified; Human Interest Supplied

ADEQUATELY fulfilling the expressed desire of company officials to present an informative and constructive summary of activities to stockholders and employes, the annual report of the Florida Telephone Corp., Leesburg, Fla., tells the complete story of the corporation's 1939 operations. The report submitted by President Otto Wettstein, Jr., commemorates the organization's 15th anniversary and interestingly and thoroughly explains its progress and policies.

Commenting upon the financial statements, Mr. Wettstein said: "Every corporation should have an informative and constructive story to tell its stockholders and employes of its financial condition as revealed by its records and accounts. In our report last year we went into detailed explanation of our accounts, but we believe that many of our stockholders and employes may still be confused by such terms as income statement, balance sheet, fixed capital, liabilities, depreciation reserve, surplus, etc. . . .

" . . . There is no reason why these statements can not be prepared so they will be crystal clear to everyone by omitting the accountant's words and phrases which require training and experience to be understood."

Following these comments, under the headings of "Money Received" and "Money Paid Out," were listed simple explanations of the year's revenues and expenses. Under the headings, "What We Owe," and "What We Own," were details of the company's assets and liabilities. Another section, simply entitled "Here Is Where the Money Goes," clearly illustrated the distribution of every dollar collected in 1939 and the distribution of every dollar of revenue.

Gross revenues, not including non-operating income, of the Florida corporation, for 1939 amounted to $311,020, compared to $283,441 for 1938; $184,500 in 1933, and $231,531 in 1929. Total operating expenses including taxes were $228,931 and net earnings were $97,288 compared to $82,340 for 1938. The amount carried to surplus after interest and amortization was $30,559 compared to $18,781 for 1938 and $14,680 for 1937.

Operating expenses, caused principally by increased wages and additional employes required to handle increasing traffic were $13,031 higher in 1939 than in 1938; 48 per cent higher than in 1933, and 36 per cent higher than in 1929.

"The record of payroll and operating expenses shows a large increase at present over both the depression low and the pre-depression high," commented President Wettstein. "It would naturally be expected that operating expenses would be higher than during the depression years, but why are they higher than in the years before the depression? . . .

"We believe profits will be enhanced . . . by increased interest, loyalty and efficiency of employes . . . from the knowledge that their futures are secure and that they are sharing in the profits of the business," stated OTTO WETTSTEIN, JR., president of the Florida Telephone Corp., Leesburg.

"First: there are 738 more telephones and 1,020 more miles of toll wire in service than in 1929; second, the commercial department shows a large increase in expenses over 1929.

"Prior to the depression this company, along with others in the same class, had never spent any money in developing or soliciting business. In those days the management problem was how to obtain enough money to meet the demand for service which came without solicitation but when the depression came and telephones continued to accumulate on shelves and revenues dropped, we realized that we had a selling job on our hands and that during the years there had developed a new and varied competition for the consumer's dollar in the way of everything from automobiles to zithers . . .

We know now that this competition makes selling service a necessary and permanent function of the business and this has necessitated the division of our territory into three districts with a manager in charge of each, which together with advertising, cash prizes to employes in sales campaigns, additional costs of billing and accounting for a larger volume of business explains the increase in the expenses of the commercial department.

The largest increase in operating expenses since 1929 is in taxes. For whatever progress has been made during the past several years in the way of increased business brought about, indirectly, by government spending, your company has been obliged to pay its full share of the heavy taxes due to the increased costs of government, both in direct tax bills and in hidden taxes in everything we buy.

Our direct tax bill in 1929 was $19,900; in 1939 it was $34,356, an increase of 72 per cent. These taxes amount to $290 annually for each employe and $6.77 for each share of stock. They amounted to 112 per cent of our surplus earnings in 1939."

For the first time in the history of the Florida Telephone Corp., the number of stations in service passed the 6,000 mark and as of December 31, 1939, the corporation had 6,086 stations. The gain of 391 during the year compares with gains of 269 in 1938, 536 in 1937, 194 in 1936, 321 in 1935, and 403 in 1934, making a total gain of 2,114 since the depression low of 3,972 in 1933 and a gain of 738 over the pre-depression high of 5,348 in 1929.

Speaking of the company's newly-developed employes' savings, profit-sharing and retirement plan, which is listed in the report as one of the outstanding and highly constructive accomplishments of the year, Mr. Wettstein said: "It has long been the aim of this management to provide for the economic protection and security of our employes during their working years and after retirement, and a means by which they could share in the profits of the business. Your board of directors and our employes have approved and put into effect a plan whereby the savings of employes to the extent of 5 per cent of their wages together with 10 per cent of the profits of the company are combined in a fund for this purpose. . . .

"The retirement plan supplements and augments benefits to employes under the Federal Social Security Law and combined with this will provide income for our employes which protects

them from dependence upon retirement. . . .

If it may occur to some of our stockholders that the board of directors seems to be running an eleemosynary enterprise by giving away 10 per cent of the stockholders' profits, we would submit that our motives in doing this were not entirely philanthropic, as we believe profits will be enhanced as much or more than the 10 per cent given to employes, by increased interest, loyalty and efficiency of employes because of appreciation of the benefits accruing from the knowledge that their futures are secure and that they are sharing in the profits of the business. . . ."

Outstanding Year Reported By Santa Monica, Calif., Co.

The year 1939 was one of marked activity and important developments for the Associated Telephone Co., Ltd., Santa Monica, Calif., states President Chas. F. Mason in the company's annual report to stockholders. "Outstanding was the acquisition on December 31 of the properties of the Santa Barbara Telephone Co., which served all of Santa Barbara county, adding 18,701 telephones to those already served by Associated Telephone Co., Ltd.," he said.

Aside from the acquisition of the Santa Barbara properties, the gain in telephones of 9,477 was the greatest in the history of the company and about 38 per cent greater than the 1938 gain. Associated Telephone Co., Ltd., is now the largest Independent operating telephone company in the United States with a total of 130,783 telephones in service on December 31, 1939.

Net income for 1939, after all deductions, was $617,976, a decrease of $3,852 from 1938's net income of $621,838. Operating revenues continued to increase with the gain in telephones and amounted to $4,124,592, which compares with $3,843,830 for 1938. Local service revenues were $3,360,663; toll service, $686,619, and miscellaneous, $97,454.

Operating expenses, exclusive of depreciation amounted to $2,260,495, an increase of $182,598 over 1938 expenses. The provision for depreciation was $834,025, an increase of 14 per cent over the amount charged to depreciation in 1938. Contributing to this increase was an adjustment of rates on several different classes of depreciable plant following a study which resulted in establishing new estimated lines and salvage values. Additions to plant also accounted for part of the increased provision for depreciation.

During 1939 net additions of aerial and underground cable and conduit (gross additions less plant displaced) amounted to $344,033. At the close of the year the company had 182,300 miles of wire in aerial cable, 202,600 miles in underground cable and 17,600 miles of open wire.

Telephones and other station apparatus and station wiring increased $305,811 during the year; buildings and central office equipment, $236,783 and other net additions to plant amounted to $162,530, making the total net plant additions equal $1,049,157. Acquisition of the Santa Barbara properties added $3,491,802 to plant values and raised the total property investment on December 31, to $23,876,290.

CHAS. F. MASON, Santa Monica, Calif., in his report to stockholders as president of the Associated Telephone Co., Ltd., stated the company is now the largest Independent operating company in the country, having a total of 130,783 telephones in service as the year closed. The 1939 gain was about 38 per cent more than in 1938.

At the beginning of 1939 there were 960 persons in the employ of the Associated company. By December 31, this number had increased to 1,112, including 143 who formerly were employed by the Santa Barbara company.

The San Joaquin Associated Telephone Co., a wholly-owned subsidiary, gained 32 stations during 1939 and on December 31 was serving 2,328 telephones in the communities of Fowler, Lindsay, Reedley and Strathmore. However, net income for the subsidiary declined from $16,984, for 1938, to $14,016 for 1939, and while total operating expenses and taxes were 7 per cent higher, the total operating revenues increased only 2 per cent.

Better Conditions Boost Southwestern Bell Revenues

Moderately improving conditions in the territory served by the Southwestern Bell Telephone Co. during 1939 brought with them, on the whole, a betterment in the business of the company, comments President A. C. Stannard in his annual report for 1939.

The number of company-owned telephones in service increased from 1,484,627 to 1,549,439 during the year. The net telephone gain of 66,246, which excludes purchases and sales, compares with a net gain of 44,736 in 1938. The total number of long distance calls, 47,744,262, also represents an increase over that handled the previous year.

As a result of this greater activity, gross operating revenues for 1939 totaled $92,897,368, compared with $89,533,935 for 1938. Total operating expenses, however, also increased from $57,935,889 in 1938 to $59,017,583 in 1939. Taxes increased from $11,889,983 in 1938 to $12,721,838 for 1939. Net earnings available for interest and dividends amounted to $21,114,888 in 1939. In the last five years the company's taxes have increased 60 per cent and its total payroll 40 per cent, while revenues have risen only 32 per cent.

At the end of 1939, the company was interchanging long distance service with 1,616 connecting companies, operating 526,913 telephones in 2,788 exchanges. In addition, there were 54,066 service telephones, mostly on farmer-owned lines, connected for service with Southwestern Bell exchanges. In 1939, connecting company telephones originated 23 per cent of the long distance messages placed by customers in Southwestern Bell territory and passing over Bell System lines.

"While the moderate gains mentioned were occurring in company business," Mr. Stannard said, "greater improvements were taking place in the service furnished by the company. With their goal a more personalized and friendly service to customers and public, all groups in the company devoted considerable effort during the year to refinements both in the technical phases of the company's operations and in the ways those operations were performed.

"Continued attention, of course, was paid to such things as improving the speed and accuracy with which local and long distance calls are handled; shortening the time needed to install telephones and make repairs; improving the work in the business offices, and increasing the accuracy with which customer's bills are handled."

The Operators' Corner

By MAYME WORKMAN

Traffic Supervisor, The Illinois Telephone Association, Springfield

JUDGMENT must frequently be combined with facts in determining amount to be charged on a long distance call. Series No. 404

HOW MUCH does the average person know about charges on long distance calls? Too little, I am afraid, judging from a conversation overheard one day when our door was open. Two men were in the hall waiting for the elevator when the writer heard the word "telephone." While not given to eavesdropping, she paused in her work to hear this conversation:

"You can get a long distance call through as quickly as a local call now. I called Chicago and the operator got my party right away. I placed another call and my party was out. They charged me $2.20 for the first call and 90 cents for the second call."

"They can't do that! They should only charge you ten cents if they didn't get your party. I'd tell them about it."

"I will when I get ready to pay my bill."

And then the elevator came and swallowed up the voices.

What a temptation to inquire: "Did you ask for a particular party when you placed that second call?" And, "Did you know that all report charges are not 10 cents? Some are 15, 25, 50 cents?"

Telephone companies in recent years have recognized the need for customer education in sponsoring open houses, advertising, and conveying information to business groups, civic clubs and school children by means of addresses, demonstrations and movies. But the conversation heard that morning emphasizes the fact that we have really just begun our educational campaign — merely touched the surface.

And now for a solution to query No. 1 this week, which was overshadowed for a moment by a conversation that drifted in from the hall. First, an error was made by the PBX operator in putting the wrong party on the line. Shall we penalize the calling party—the man who is going to pay for the call—for the PBX operator's error? He placed the call in good faith and expected to pay for it if he reached the party he called for. Second, did the calling party derive any benefit or secure information concerning the called party which would constitute a chargeable report? Third, how long was the connection established?

These are three of the major considerations involved in determining what action should be taken in regard to the charge on the call. The supervisor or chief operator must determine the facts in the case before making a decision.

For example, if the calling party was not immediately aware that he had been connected with a wrong party and, after a minute of conversation, the person at the called station would say, "I don't believe I am the Mr. Smith you want to talk to. J. R. Smith has charge of that department but he is out-of-town and will not be back until Friday." In this case the message charge should be canceled, a report charge assessed on the call, and an explanation as to the reason for the report charge should be given to the calling party.

If, in the foregoing, no information was volunteered concerning the called party, no satisfaction would have been obtained on the call and, in this case, the charge could be canceled.

If the supervisor or chief operator can obtain no definite information as to what happened on the call and she has reason to believe, perhaps from past experience, that the calling party is inclined to take advantage of the telephone company, she may refuse to waive the message charge.

Because of the many conditions involved in the call outlined in query No. 1, no definite answer can be given except that judgment must be used in making a decision, keeping in mind fairness to the customer and company alike.

Questions from Illinois Operators

1. If a PBX operator puts the wrong party on the line and you are holding your party so they

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FAILURE of ordinary anchors to hold under particular ground conditions were causing guying failures — interruptions — costly repairs . . . Then, Kearney Engineers were asked to make recommendations. Kearney 2-Way Expansion Anchors met all test requirements — were first choice among all anchors tested . . . Today, thousands of anchors are being used . . . no "pull-outs", no costly risks of guying failures. But see for yourself how these specially designed anchors have blades that expand 2½ times their rated size and have 63 per cent of their blade area in solid, undisturbed earth . . . to give you maximum holding power — minimum risk of guying failures.

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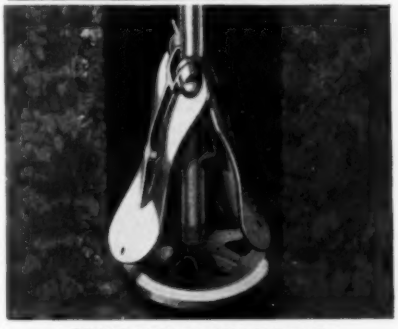

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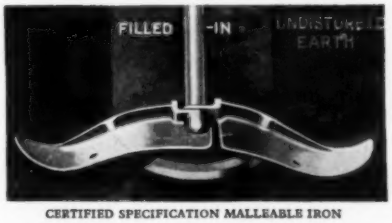

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start conversation but, after finish of conversation the calling party refuses to pay for the call, is it proper to tell him he will have to pay for it?

2. Is there a report charge if a room telephone in a hotel is DA?
3. Explain why "calling station DA" is a chargeable report when ready to establish connection on a person-to-person call?
4. If a subscriber in placing a long distance call gives only his number, should the operator try to secure his name?
5. If a long distance call is placed to a point for which there is a toll charge and a report is received that the called party can be reached at a point which is a free service point, how is the ticket handled?

The answers to these traffic questions are given on page 32.

New home of The Mutual Telephone Co.'s exchange at Manchester, Ga.

With the Manufacturers

Masterbuilt Junior Board Installed at Chokio, Minn.

By Jay Houghtaling,
Representative, Kellogg Switchboard & Supply Co.

The Chokio Telephone Co. of Chokio, Minn., recently installed a new Kellogg Masterbuilt junior switchboard. The new switchboard has an ultimate capacity of 200 town lines and 40 farm or rural lines. At present it is equipped with 80 universal lines and 40 rural lines.

If the town of Chokio booms unexpectedly and subscribers increase to a point where the existing equipment is inadequate, another unit can easily be added. This second unit would be similar to the board recently installed and can be placed side by side with it on a non-multiple basis, thereby doubling the exchange's capacity.

The universal line circuits used on the new board make it simple to cut over one or more lines at a time from magneto to common battery service. The transition from magneto to common battery is made by changing just two wires on the relay. No additional wiring or equipment is needed in changing.

The installation was completed in a very short time since all Masterbuilt junior switchboards are shipped completely wired, assembled and tested, with the cable fanned out ready for connecting to the exchange wiring.

The exchange is housed in a modern 24-foot by 40-foot brick building. It is completely air-conditioned and thoroughly up-to-date.

R. W. Davidson, owner and manager of this progressive exchange is well satisfied with the new equipment which provides the community with speedy, efficient service. His son acts as night operator. Needless to say, the town folks are also well pleased with the modern service they are now receiving.

Modern air-conditioned exchange building of the Chokio (Minn.) Telephone Co.

In this view of the Masterbuilt junior switchboard installed at Chokio, Minn., are shown R. W. DAVIDSON, owner of the Chokio Telephone Co., and his son who acts as night operator.

Manchester, Ga., Gets New Building and Equipment

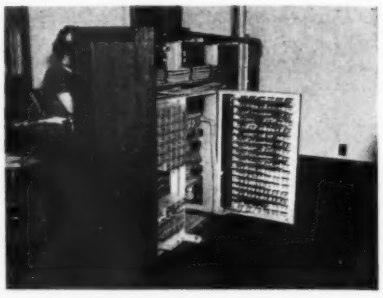
By Kenneth F. Stegman

The evening of February 14 saw officials of the Mutual Telephone Co. of Manchester, Ga., banqueting with their guests in the Hotel Manchester to celebrate the cutting-over that night of new central office telephone equipment, and to dedicate the new building housing it.

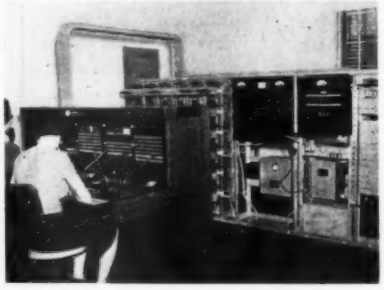
The old magneto system was destroyed months ago by fire and temporary equipment had served Manchester since. During the interim, plans developed for a completely modern telephone exchange to replace the one destroyed were carried to completion.

The first move of a permanent nature after the fire was installation of a new system for Manchester's companion exchange at the neighboring Warm Springs Foundation. This was completed last May. Immediately following the completion and cutting-over of the Foundation unit, work was begun on Manchester's exchange.

As a starter, new poles were set and cables were installed, giving the city almost a complete cable network. Simultaneously a new brick building was erected to house the latest type of Stromberg-Carlson switchboard and accessories.



Rear of new Stromberg-Carlson switchboard at Manchester showing relay gate swung open.



Combined operating and terminal room at Manchester, Ga., showing Stromberg-Carlson junior multiple switchboard and auxiliary equipment recently cut into service, to replace old magneto equipment.

Selected to give improved service was a Stromberg-Carlson two-position junior multiple type switchboard and complete Stromberg-Carlson central office equipment including terminal power machine equipment. The new switchboard has 260 local central energy lines, 20 rural lines of the lamp signal type, and 10 toll lines with universal machine ringing cord circuits.

Following the dedication dinner at the Hotel Manchester, the party adjourned to the new exchange building where they were joined by local visitors for the formal inauguration of the city's new telephone service.

Among the out-of-town visitors present were E. B. Emrey, Georgia commercial manager of the Southern Bell System; Jud Milan, district manager, Lagrange; Roy Freeman, North Georgia division, Atlanta; Walker Kinsman, manager of the Griffin system, Griffin; C. S. Bolen, editor, Southern Telephone News, Atlanta.

HARRY N. HAYES was recently appointed general sales manager of Coffing Hoist Co., Danville, Ill.

ROLAND WHITEHURST, Electric Storage Battery Co.'s newly-appointed general sales manager, was manager of the company's Washington, D. C., branch for many years.

General Sales Manager of Coffing Hoist Co.

The Coffing Hoist Co., Danville, Ill., announces the appointment of Harry N. Hayes as general sales manager. Mr. Hayes has been with the company for a number of years, during which time he acted in the capacity of district sales manager in various territories.

Previous to becoming affiliated with the Coffing Hoist Co. he had many years of engineering and selling experience. He is thus well qualified for his new position in a field in which he is well known.

Roland Whitehurst, Exide's Assistant Sales Manager

Roland Whitehurst, formerly manager of the Washington branch of the Electric Storage Battery Co., manufacturer of Exide batteries, has been appointed assistant general sales manager with headquarters at the home office of the company in Philadelphia, Pa. He will be succeeded as manager of the Washington branch by J. A. Klingensmith, who, as a member of the local Exide sales staff, is widely known there in business circles.

Mr. Whitehurst, has been in the employ of the company since 1908, and was manager of the Washington branch for 20 years. Prior to that he was attached to the company's New York branch.

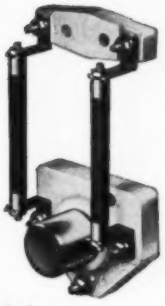
Richmond (Va.) Warehouse of American Automatic Electric

G. B. Pratt, formerly representing American Automatic Electric Sales Company in Syracuse, N. Y., and surrounding territory, has been placed in charge of the company's Richmond, Va., warehouse. His former territory has been apportioned among three neighboring sales territories now covered by American Automatic Electric Sales Company representatives.

In his new position, Mr. Pratt will utilize to good advantage his extensive knowledge of the needs of operating companies for telephone apparatus and supplies — knowledge which he has gained through many years of personal contact with telephone organizations small and large.

FOR INDOOR INSTALLATIONS

SANDS



TYPE 12 SUBSTATION PROTECTOR

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TYPE 12 SPECIFICATIONS

Uses wood or fibre fuses, as specified. Two piece porcelain base. Two Type 2105 discharge blocks. Inside Mounting.

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New Air Circulator for Operating Rooms

Russell Electric Co., Chicago, announces a new fan unit, which is specially designed for telephone operating rooms. This unit, called the "Telefan," is said to be the first practical unit ever designed to satisfactorily provide air circulation below the keyboard level, with almost noise-free operation.

The result of years of research, the Telefan accomplishes its effect by means of a 22-inch two-blade fan of unique design, driven by a powerful quiet-running motor. An eight-speed control permits selection of speeds from 500 r.p.m. to 1600 r.p.m., furnishing air motion from a gentle breeze to a gale.

It is stated that the Telefan can be placed on the floor for air circulation at low level with complete safety, since the fan is enclosed on four sides and top by a cage of heavy welded wire mesh—providing full protection from the fan blade while in motion.

The Russell Telefan is said also to be suitable for use in any office, providing maximum air motion at a low noise level.

Being of sturdy construction and designed for long service, the Telefan is said to provide telephone operating room ventilation with minimum maintenance cost.

A bulletin on this new unit now offered to Independent telephone companies for the first time, is available upon request to this publication or direct to the manufacturer, Russell Electric Co., 345 W. Huron St., Chicago.

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Oliver Iron & Steel Corp.'s Pole Line Hardware Representative

Oliver Iron & Steel Corp., Pittsburgh, announces the appointment of Joseph H. Beaty as its exclusive pole line hardware district sales representative in the states of Alabama, Georgia, Tennessee and northern Florida—with headquarters at Birmingham, Ala.

For the past 20 years Mr. Beaty has been identified with the sales and engineering departments of both Westinghouse Electric & Mfg. Co. and with Wagner Electric Corp. of St. Louis.

Commission and Court Activities

Oral Arguments Started on St. Paul Rate Case

The hearing before the Minnesota Railroad & Warehouse Commission on St. Paul telephone rates was virtually concluded March 28 and oral arguments were begun April 18. After conclusion of the arguments, counsel were given time to submit written briefs.

In response to a request by Commissioner Hjalmar Petersen, C. B. Randall, general counsel of the Tri-State Telephone & Telegraph Co., called a witness to testify concerning the company's financial setup April 18, after which the case was submitted to the commission.

▼ ▼

Company Rule on Telephone's Use Declared "Unreasonable"

A telephone company regulation that each instrument be installed for the exclusive use of the subscriber, members of his family and his employes has been held to be "unreasonable" by the Arkansas Supreme Court.

The opinion was expressed on April 8 in affirming the Washington Circuit Court's findings that the Southwestern Bell Telephone Co. discriminated against two Fayetteville, Ark., business houses in refusing them service at the same rate paid by similar establishments there.

The state supreme court ruled that the telephone company must pay $510 to Mrs. Carrie Lee, operator of the Campus cafeteria at the University of Arkansas, and $850 to S. B. Hanna, owner of the Waffle House cafe, in penalties under a 1914 statute for failure to provide service.

Both subscribers were refused service at the $3.50 monthly business rate unless they would place the instruments in places not accessible to University of Arkansas students and others. A $10.50 rate was specified for this service with the telephone placed on a counter.

Citing testimony that other establishments were served for $3.50 and had telephones which students used, the court said the company must abide by one of its tariff regulations which provides:

"The telephone company has the right to refuse to install customer service or to permit such service to remain on premises of a public or semi-public character when the instrument is so located that the public in general may make use of the service."

The court said the company could not ignore this rule as it affected some business houses and require that it be observed by others. Referring to the "unreasonable" rule limiting telephones to the use of the subscriber, his family and servants, the court said:

"Telephones are not like cash registers or typewriters in a place of business, used only by those engaged there. The telephone is presumed to be an open channel of communication every minute of the day and hundreds of calls would not consume or use up any part of it, nor would this great number of calls tend to impair in the least the service.

We think it must appear, therefore, that the agents of the telephone company who sought so assiduously to avoid rendering a free service to the university students are denying to a large number of subscribers the right to receive calls no doubt contemplated.

No university student ever put in a call without a number paid for by another subscriber whose telephone was perhaps installed for the very purpose of receiving such communication."

Justices E. L. McHaney and Frank Smith dissented.

▼ ▼

Oklahoma Bell Continues Efforts to Halt Rate Cuts

Two more important moves were taken last week by the Southwestern Bell Telephone Co. in its attempts to increase rates in several of its Oklahoma exchanges and at the same time forestall rate reductions in other exchanges which have been ordered made by the Oklahoma Corporation Commission.

The state supreme court on April 9 dismissed an appeal of the Southwestern Bell which had requested the issu-

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ance of a court order that would allow it to place in force higher temporary rates in 21 of its exchanges. The court held that the Oklahoma commission ruling of October 19, 1939, which refused to consider the Bell's application for temporary rate increases, was not an appealable order.

The court said that the order was not appealable because it was issued while the commission was hearing evidence in the statewide rate case and before it had issued a general order fixing permanent rates.

On April 10 the Southwestern Bell filed with the federal court in Oklahoma City, an application for an injunction to restrain the commission from preventing the company from putting the temporary rates in force. The application also requested issuance of an injunction to prevent enforcement of lower exchange rates in 33 cities as ordered by the commission February 21.

The federal court through Edgar S. Vaught, United States district judge, issued an order returnable April 19 which placed in effect a temporary restraining order against the commission in the 21 towns until after the hearing.

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Damage Suit Reversal Favors South Carolina Company

The South Carolina Supreme Court on March 28 handed down a decision reversing the lower court where a verdict for $1,500 damages had been awarded E. J. Miller and E. E. Miller, residents of Jefferson, Chesterfield county, against the Central Carolina Telephone Co. The case was remanded to the lower court for entry of judgment in favor of the company.

The record of the case sets forth that E. J. and E. E. Miller operated a drug store and their customers would frequently use the telephone for long distance calls and "sometimes neglected to pay for them." The operators of the store were required by the company to pay for these calls and as a result they had the telephone removed.

Later the plaintiffs decided to have a telephone re-installed in the store and agreed to "pay the established rate" for service. The company, according to the record, some time later presented a bill of $6.05 for long distance calls made over the line and the plaintiffs claimed that the calls had not been authorized by them.

The drug store operators claimed that under a verbal contract with the telephone company their liability for long distance calls was restricted to calls actually made by them. The telephone company denied such contract. The drug store operators refused to pay the bill and after notice the company discontinued service. Whereupon the Millers brought action for actual and punitive damages. The case was tried and the trial court returned a verdict for $700 actual and $800 punitive damages.

The telephone company appealed to the state supreme court and in the opinion, written by Acting Associate Justice E. H. Henderson, the finding of the lower court was reversed.

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Summary of Commission Rulings and Hearings

Federal Communications Commission

April 4: The commission granted the petition of the Bell Telephone Co. of Pennsylvania, Southern Bell Telephone & Telegraph Co., New Jersey Bell Telephone Co. and American Telephone & Telegraph Co. requesting dismissal of the proceedings in the matter of "Qualified Toll Line Service," as it appears that the principal purpose of the proceeding has been accomplished by the filing of revised tariff schedules with the commission effective March 25.

April 5: Indiana Bell Telephone Co. filed informal application requesting permission to supplement existing facilities between Sullivan, Ind., and the Indiana-Illinois state line.

Illinois Commerce Commission

April 16: Hearing in Springfield on application of Illinois Bell Telephone Co. for authority to file changes in its schedule of exchange rates applicable to Salem exchange on less than 30 days notice.

April 16: Hearing in Springfield on application of Illinois Central Telephone Co. for an order approving increased rates for local exchange and rural service in Washington.

April 17: Hearing in Springfield on application of Illinois Valley Telephone Co. for an order approving increased rates for local exchange and rural service at Morton, to be effective upon the installation of certain automatic equipment.

Michigan Public Service Commission

April 16: Hearing in Lansing on application of Michigan Bell Telephone Co. for authority to enlarge Grand Rapids exchange.

April 18: Hearing in Lansing on application of Michigan Bell Telephone Co. for authority to revise tariff relating to season service.

April 18: Hearing in Lansing on application of Michigan Bell Telephone Co. for authority to enlarge base-rate area of Southfield zone of Detroit district exchange.

Missouri Public Service Commission

April 12: Joint application filed by the Central Missouri Telephone Co. requesting authority to sell and by A. F. McAdams requesting permission to purchase the telephone exchange at Rayville.

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PARAGON ELECTRIC COMPANY

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April 18: Hearing on application of Western Light & Telephone Co. for authority to issue bonds.

April 23: Hearing on application of Dorsey Telephone Co. for issuance of order authorizing the filing of a new rate schedule for Braymer.

New York Public Service Commission

April 5: Hearing held in Buffalo in commission's investigation to determine whether the equipment of the Inland Telephone Co., Inc., which furnishes service on Grand Island, Erie county, is "adequate, inefficient, improper or insufficient."

Franklin Ness, Jr., counsel for the Inland company, informed the commission that negotiations for the sale of the company to the New York Telephone Co. are under way and the hearings were adjourned pending their completion.

April 18: Hearing in New York on proceeding on motion of the commission as to rates, charges, rules and regulations of New York Telephone Co. for extension, tie, private and lease lines in the city of New York.

April 17: Further hearing in New York on proceeding on motion of the commission as to certain rates, rules and regulations of New York Telephone Co. in respect to service through private branch exchanges in hotels, apartment houses and clubs.

Ohio Public Utilities Commission

April 10: The commission authorized the Ohio Bell Telephone Co. to file new schedules for Carroll, Rushville and Sugar Grove exchanges, in which the existing rates will be republished dropping the delayed penalty.

Base-rate areas will be revised to conform to demands for base-rate area service, and the revision of the service area to show that subscribers in the exchanges are to receive free service to the Lancaster and Canal Winchester exchanges as well as the three exchanges of the Bell, the Amanda exchange of the Ohio Associated Telephone Co. and the Baltimore, Millersport and Pleasantville exchanges of the Buckeye Lake Home Telephone Co.

April 10: The commission approved new boundaries for the Centerville and Franklin exchanges of the Ohio Bell Telephone Co. involving the transfer of a small territory of the Centerville exchange where there is no development, to the Franklin exchange lines which are in close proximity.

The commission also approved new boundaries for the Piqua exchange of the Ohio Bell, and the Sidney exchange of the Ohio Telephone Service Co. involving the transfer to the former of a small undeveloped area now in the territory of the latter company.

Oklahoma Corporation Commission

May 21: Hearing on application of the Oklahoma Telephone Co. requesting increased exchange rates in Fairfax.

The application places the fair value of the exchange at $38,297.52, states that net earnings for the year ended December 31, 1939, were only $355.35 and that increased wages and salaries and decreased revenues due to a commission order of October 10, 1939, reducing handset rates, will further lower annual returns, beginning January 1, 1940, to approximately $57.27.

The application asks the following monthly rate increases at the Fairfax exchange: Business, one-party, wall or desk, from $2.75 to $3.75; one-party monophone, $2.90 to $3.90; residence—one-party, wall or desk, $1.50 to $2.35; one-party monophone (employe) $1.15 to $1.75; one-party monophone, $1.65 to $2.50.

The company estimates that if the proposed increases are granted the net earnings of the Fairfax exchange will not exceed 7.16 per cent.

Pennsylvania Public Utility Commission

April 5: The Bell Telephone Co. of Pennsylvania filed a tariff for establishing a new exchange at its office in Rochester, Beaver county, to be known as Ohioview. The exchange will take in some subscribers now served from the Midland central office and some served from Rochester.

Service is to become effective June 1, starting with 66 subscribers. The rates for the new exchange are: Residence, individual, $3.00; two-party, $2.50; multi-party, $2.10; business, individual, $5.00; two-party, $4.50, and multi-party, $4.00.

Wisconsin Public Service Commission

April 6: Wisconsin Telephone Co. authorized to extend its lines in the towns of Caledonia, Jefferson, Grand Chute and Walworth.

April 16: Hearing in Madison on application of Poplar Rural Telephone Co. for authority to dissolve.

April 17: Hearing in Darlington on application of the Belmont-Pleasant View Telephone Co. and the Willow Springs Telephone Co. for authority to make physical connection between the telephone system of the Wisconsin Telephone Co. and the telephone systems of the petitioning companies in the city of Darlington and adjacent territory.

April 19: Hearing in Madison on application of Johnstown Line, town of Dodgeville, Iowa county, for authority to sell and of Commonwealth Telephone Co. for authority to purchase the former's property and apply standard rural rates to Johnstown Line subscribers.

April 30: Hearing in Madison on application of the Canton Farmers Telephone Co. for authority to increase its rates.

May 3: Hearing in Waukesha on application of Commonwealth Telephone Co. for authority to discontinue non-standard toll rate between Merton and Pewaukee.

ANSWERS TO TRAFFIC QUESTIONS ON PAGE 28

1. Please refer to preface.
2. "Room telephone DA" does not constitute a chargeable report. However, if the called party is paged, the call is subject to a report charge.
3. The telephone company has used its facilities and employe's time to reach the desired party thereby fulfilling its part of the contract. The fact that the calling station does not answer is beyond the control of the telephone company, therefore, they are justified in assessing a report charge.
4. The calling party's name must be secured on all collect, appointment, messenger, conference, and hotel extension CLR calls, and calls on which the calling party wishes the call charged to another telephone. In any other case, it is not necessary to secure the calling party's name unless the management of your company has specifically requested you to do so.
5. A report charge is made on the first call, which is canceled. The connection is then established to the free service point.

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NEBRASKANS STUDY THEIR BUSINESS

(Continued from page 19)

with changes in the wave shape of the voltages and currents on the system.

The large range in influence (upwards of 100:1) observed in tests in different exposures to power systems of the same general type due to differences in harmonic voltages and currents was mentioned. It was concluded that it is very important in inductive coordination problems to think in terms of harmonics and not in terms of the fundamental power system frequency (usually 60 cycles).

Factors affecting telephone circuit susceptiveness were then discussed. The inherent difference in susceptiveness between ground return and metallic telephone circuits (about 100:1) was demonstrated. Mention was made of several measures which had been tried in various places to reduce the susceptiveness of ground return telephone circuits. It was pointed out that these measures had been used only to a limited extent because of their limited effectiveness, their effect on transmission or their cost. Their greatest field of application has been as "stopgaps" to give a measure of relief until a long-term general program could be worked out.

The effects of various types of unbalances on the susceptiveness of metallic telephone circuits were demonstrated. The effects of "high resistance" joints in line wires were clearly shown and it was mentioned that the increased use of various forms of joints, in which the wires are joined in a single sleeve under very high pressure, are proving to be helpful in this connection. The importance of keeping the lines free from leakage of various kinds, and of using adequate transpositions was demonstrated. The effects of subset and central office unbalances and the factors controlling these effects were also discussed.

The discussion closed on the note that while coordination problems now facing the power and telephone industries are complex and difficult, the history of the subject clearly indicates that with tolerance and cooperation on both sides and with continued active development work the prospect need not be dismaying.

Accurate Accounting Will Prevent Future Troubles

I. J. Devoe, general auditor of the Lincoln Telephone & Telegraph Co., Lincoln, and also general chairman of the accounting division of the national association, discussed the advantages of accurate accounting. He said that the enactment of federal legislation, particularly that relating to social security, wages and hours, and income taxation, made it essential that the books of a company accurately reflect its operations. The danger of failure was emphasized.

Mr. Devoe also discussed cash and accrual methods and pointed out how wrongful application of principles of accounting may result in sacrifice of investments. He was mildly critical of the old policy of the railway commission in requiring combination of depreciation and maintenance, and pointed out, as one of the results, the absurdity of reports showing a deficit in the depreciation account. He commended the work of Chief Accountant Schnell of the commission in setting up a uniform system of accounts for Class C and D companies.

Unemployment Compensation in Nebraska

Charles G. Nowacek, chief statistician of the unemployment compensation division of the Nebraska Department of Labor and a member of the national committee for the study of experience rating, said that variation in individual employer contribution rates under the Nebraska Unemployment Compensation System became ef-

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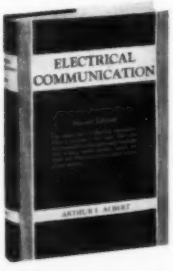

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fective for the first time during the calendar year 1940.

Merit rating, or what is commonly known at the present time as experience rating, received attention in the unemployment insurance schemes and statutes of Great Britain and Germany, said Mr. Nowacek. While the provisions did not become generally operative they received considerable attention, differing, however, in purpose and objective over the philosophy contained in the original Wisconsin law and the present state unemployment compensation laws that provide for experienced rating. Providing a motive for stabilization was the principal objective and reason for experience rating provisions of the present unemployment compensation laws.

The present state and federal laws provide certain minimum standards that must be met before an employer under the Nebraska act can be rated for a variable contribution rate. These include the requirements that the reserve balance must equal at least 7½ per cent of the preceding calendar year's payroll, as well as equaling five times the highest benefits paid during any of the three preceding calendar years. In addition, benefits must be payable from the reserve account during the preceding calendar year.

The 1940 plan for establishing individual employer contribution rates was established by regulation during the latter part of 1939 and provided four rates below the standard 2.7 per cent of 2.5, 2.0, 1.5, and 1.0 per cent determined on the basis of a comparison of benefits and total contributions. The 1940 plan will not necessarily be effective during future years for the determination of individual rates, the speaker stated.

"Experience rating, from the point of view of the national picture, is not as yet an established institution or a generally accepted concept in the field of unemployment compensation," said Mr. Nowacek. "Certain states as yet do not provide for experience rating and many students in the field are skeptical of its ability to achieve its purposes and objectives.

"Because of certain changes in the federal law relating to reserve funds standards, Nebraska must amend its state law if compliance and approval of the state law are to be secured."

Fire Rate Reduction to Farmers Having a Telephone

R. C. Reno, chairman of the national association fire insurance committee, was unable to be present, but W. W. Johnson read a paper he had prepared. In it Mr. Reno stated that convincing insurance companies that the telephone is the most valuable single fire protection unit on the farm and that farmers with telephones should be given a lower rate has proved a long and not very successfully accomplished task.

The committee finally convinced the insurance companies of the justice of a lower fire protection rate, but the various underwriter boards that have jurisdiction over such rate reductions have to be sold on the proposition. By training their guns on the western underwriter board, which has jurisdiction over 15 midwestern states including Nebraska, a schedule of reductions aggregating 10 per cent was secured.

The board, however, refused to allow reductions for the telephone alone, but tied on two more requirements which must first be met. These were that the farmer must be located not more than ten miles from a state-approved motorized rural fire department and be eligible to receive service, and he must have an artificial or natural water supply of at least 3,000 gallons. Only a few rural departments have been established and many farmers do not have sufficient water supply available.

The committee is lending its efforts to secure a reduction in the water requirement and establishment of more rural fire districts. The committee feels great progress has been made in getting the telephone recognized as a fire protection unit, and if the requirements can be liberalized many farmers will take advantage of the rate reduction by putting in telephones.

Nebraska has a good law that can be utilized in adding to the number of rural fire districts, and the value of these to the industry should impress telephone men with the importance of becoming active in movements for their establishment, because in the long run they will make telephone service of more value in fire protection which would naturally result in the installation of more rural telephones.

One factor that has retarded the movement is the fact that the concessions made so far have been by stock fire insurance companies, whereas the major portion of farm fire insurance is written by mutuals. During the last year the committee has been contacting mutual insurance leaders in an effort to get them to recommend a schedule of rate reductions, and to get several to try out the schedule but little success had been met.

Mr. Reno urged telephone men to contact mutuals operating in their territory, and to bring pressure to bear from the farmers themselves. It also would be of assistance to urge stock company agents to feature the reductions when approaching farmers on fire insurance. Activity on the part of the companies would tend to put pressure on the underwriters to liberalize their requirements and encourage mutuals to take action.

Discussion on Inductive Interference Problems

Highland H. Wheeler, Jr., chief engineer of the Lincoln Telephone & Telegraph Co., reported for the Nebraska joint committee on physical relations between electric supply and signal lines, and expressed appreciation of the excellent work done by M. T. Caster in the past as a representative of the association.

Mr. Wheeler said he is still of the opinion that the burden of costs should rest entirely with the telephone people in the matter of grounded rural circuits in the presence of power line construction and the financial obligation of remedial measures for situations that arise. Any other view, he said, merely temporizes and results in no permanent solution.

The committee had undertaken to warn telephone companies against signing what it regarded as a fantastic agreement with respect to assuming the burden of removing electric interference, and had performed several chores possibly not within its jurisdiction. He said telephone people might well take a lesson from the ability of the rural public power districts financed by the government to extract rates from Nebraska farmers for a valuable service at a time when many telephone people considered that an impossibility.

Mr. Wheeler said that, on the whole, the remaining rural telephone service has not suffered substantially from rural electrification. The Nebraska law on this subject was written more than 20 years ago, and the commission has done the best it could with its interpretation. Improvement should be sought in planning routes so that we need not have both sides of highways occupied by power lines to the preclusion of telephone service.

Telephone companies would not then need to bear the burden of policing the construction and maintenance of power lines to safeguard their property and their people, and the physical provisions for both of these essential services could be provided with the utmost safety, economy and convenience.

Convention Concludes with Various Program Features

Louis Pitcher, executive vice-president of the United States Independent Telephone Association, reported at length on its activities along the lines of his discussions before other state conventions and reported in previous issues of TELEPHONY.

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Valentine Clark Corporation, 2516 Doswell Ave., St. Paul, Minn.—Finishd Cedar Poles. Plain or butt-treated.

Memorial resolutions were adopted on the passing of George E. Becker, secretary and managing director of the Pawnee Telephone Co., of Pawnee City; Oscar Clifford, of Teel, for a quarter of a century secretary-treasurer of the Farmers Independent Telephone Co., at Red Cloud, and John P. Lahr, manager of the Beatrice district of the Lincoln Telephone & Telegraph Co. Mr. Becker was a former president of the state association, and the resolution expressed appreciation for his untiring zeal in advancing its interests and that of the industry, and referred to him as a man whose valuable counsel and assistance will be greatly missed.

General resolutions adopted put the association on record as having concluded one of the best conventions ever held, and specifically expressed appreciation of the various persons and associations that had contributed to that end.

No change was made in the directorate, which now consists of A. B. Clark, Columbus; D. M. Davis, Aurora; C. L. Kelly, North Bend; E. C. Hunt, Blair; D. E. McGregor, Gibbon; B. G. Miller, Crete; H. L. Frentress, Omaha; H. F. McCulla, Lincoln, and C. A. Patterson, Arapahoe.

Amusement features of the convention were particularly enjoyed. Fifty members took part in the gold game the afternoon preceding the formal opening of the convention, and at the conclusion were given a fine "feed." The closing banquet was featured by an excellent repast, a fine entertainment program and a dance.

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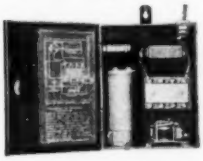

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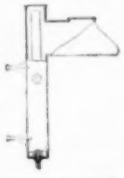

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WANTED TO BUY: Telephone plant in the Middle West, 500 stations or more. Will consider several exchanges if grouped. Write No. 8909, care of TELEPHONY.

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HELP WANTED: Combination repairman and exchange manager for magneto exchange of 800 stations, located in western Pennsylvania. In reply state age, experience, education, if married and salary expected. Write No. 8926, care of TELEPHONY.

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By a telephone company located in the Middle West, an electrical engineer capable of making up improvement and retirement requisitions under the supervision of general plant superintendent. Competent to set up plant accounting that will tie in with the general standard accounting system of the company. Address No. 8924, care of TELEPHONY.

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POSITION WANTED: Telephone plant man with broad experience in supervision and maintenance of magneto and common battery exchanges, desires to make change around May first. Understands plant engineering, construction and cost estimating. Age forty, sober, healthy, ambitious and energetic. Now employed as Division Manager by large Ohio operating company. Will go anywhere. Excellent recommendations. Address No. 8919, care of TELEPHONY.

FOR SALE

FOR SALE: Western Electric No. 11 Common Battery local and toll switchboard. Equipped with 600 common battery lines and 50 toll and rural lines. Switchboard now in use and good condition. Will be available July 1st. If interested communicate with Milledgeville Telephone & Telegraph Company, Milledgeville, Georgia.

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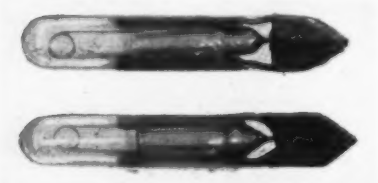

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BUCKEYE TELEPHONE and SUPPLY COMPANY

COLUMBUS, OHIO

IN THE NATION'S CAPITAL

(Concluded from page 10)

ing the early part of the nineteenth century, railroad engineers were fussing about how wide railroad tracks ought to be.

Out of this discussion the standard gauge track was evolved. It is not necessarily the best standard that could have been decided upon. But some kind of a decision was necessary if the railroad industry was ever to get started. Chairman Fly compared this situation with the dispute over television standards.

But the parallel is somewhat defective because the width of railroad track, once decided upon, became irrevocable. Through train connections between different systems would be impossible unless the standard gauge were maintained. The decision was literally spiked to the ground.

With television, however, there is more flexibility. Testimony from witnesses for both RCA and the rival DuMont faction admitted that unit changes could be made in television sets for sums as low as $20 which would enable the same set to receive both standards of transmission. This obviously suggests a degree of elasticity that will eventually point the way out of this controversy. As a result, a reasonable compromise on standards should see the television industry well on its way within the next couple of months.

* *

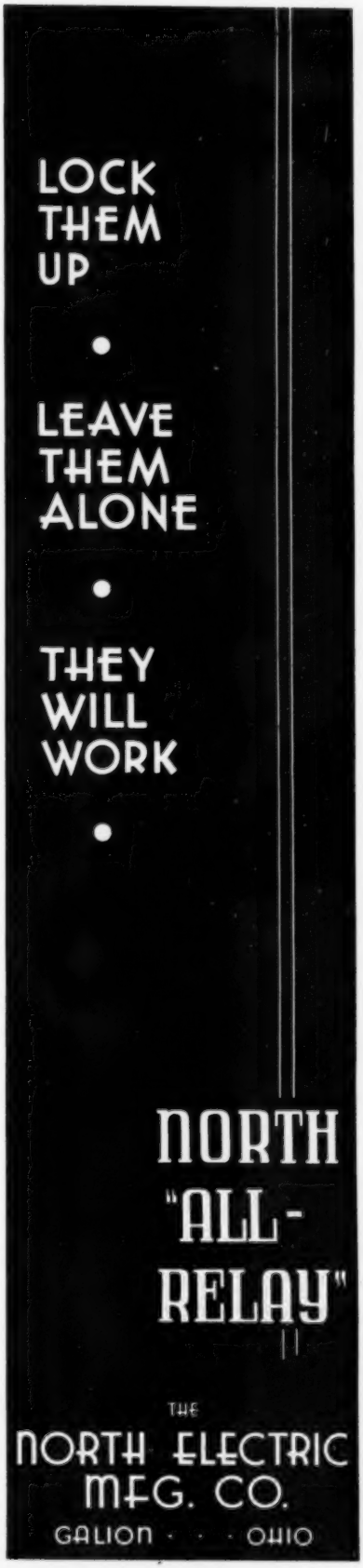
P.S. Supplementing the notes on Mexico in last week's issue of this department are the following data on telephone service which had to await certain confirmation:

Mexican telephone service is carried on by two private companies: (1) The Compania Telefonica y Telegrafica Mexicana, affiliated with the IT & T (which does 40 per cent of the business) and (2) the Compania de Telefonos Ericsson, affiliated with the firm of L. M. Ericsson of Stockholm, Sweden (which does 60 per cent of the business).

In addition, there are several long distance lines operated by the government in connection with the publicly-owned telegraph system. In 1939, there were only 160,000 subscribers registered for the entire country, whose population, according to the 1930 census, is little less than 17,000,000.

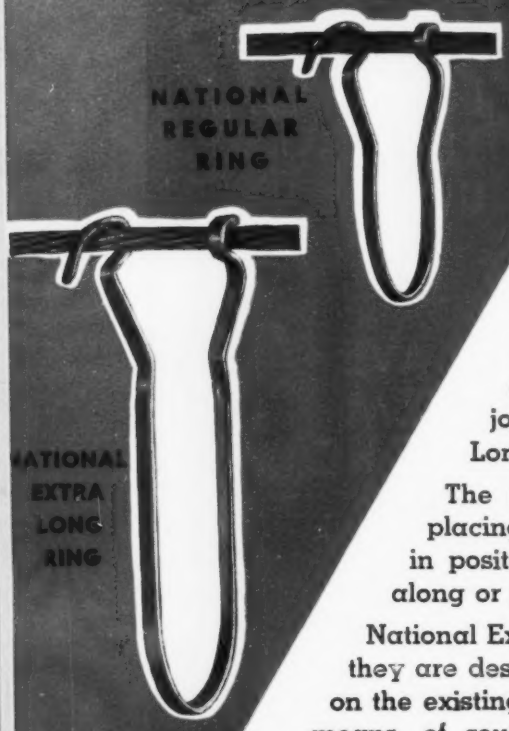
Index to Advertisers

	Page
American Appraisal Co., The	35
American Automatic Electric Sales Company	18-19-29
American Creosoting Co.	—
American Fork & Hoe Co., The	—
American Steel & Wire Company	—
American Telephone & Telegraph Company	—
Anaconda Wire & Cable Co.	—
Armstrong Cork Co.	—
Automatic Electric Co.	20-21-29
Automatic Telephone & Electric Co., Ltd.	—
Babcock Garrison	35
Bartlett Mfg. Co.	—
Berry & Co., L. M.	—
Brach Mfg. Co., L. S.	24
British Insulated Cables, Ltd.	—
Buckeye Telephone & Supply Co.	36
Burgess Battery Co.	—
Burroughs Adding Machine Co.	—
Calculagraph Company	—
Carney & Co., B. J.	35
Chance Company	—
Christiansen Co., C. M.	35
Churchill Cabinet Co.	—
Coffey System & Audit Co.	35
Coffing Hoist Co.	—
Columbia Steel Co.	—
Cook Electric Co.	32
Cook's Sons, Inc., Adam	—
Cope, Inc., T. J.	—
Copperweld Steel Co.	—
Cuneo Press, Inc., The	—
Davey Tree Expert Co.	—
Donnelley & Sons, R. R.	—
Electric Products Co., The	—
Electric Storage Battery Co.	—
Everstick Anchor Co.	—
Fansteel Metallurgical Corp.	—
Forged Steel Products Co.	—
Fort Wayne Printing Co.	—
Fowle, Frank F.	35
General Cable Corp.	—
General Electric Co.	—
Goshen Mfg. Co., The	—
Gould Storage Battery Co.	—
Graybar Electric Co.	—
Gray Manufacturing Co., The	4
Harter Corporation, The	—
Herdrich & Boggs	35
Highway Trailer Co.	—
Holtzer-Cabot Electric Co.	—
Indiana Steel & Wire Co.	—
International Creosoting & Construction Co.	35
International Harvester Co.	—
Joslyn Mfg. & Supply Co.	—
Kearney Corp., James R.	27
Kellogg Switchboard & Supply Co.	2-3
Kennecott Wire & Cable Co. (subsidiary of Kennecott Copper Corp.)	35
Kester Solder Corp.	—
Klein & Sons, Mathias	—
Leich Sales Corporation	—
Lenz Electric Mfg. Co.	—
Line Material Co.	—
Loomis Advertising Co.	35
Lorain Products Corporation	—
MacGillis & Gibbs Co.	35
Matthews Corp., W. N.	—
Michigan Pole & Tie Co.	—
National Carbon Co., Inc.	—
National Construction & Engineering Co.	—
National Telephone Supply Co.	36
North Electric Mfg. Co., The	37
Owens-Illinois Glass Co., Hemingray Division	—
Paine Company	—
Paragon Electric Co.	31
Partridge Lumber Co.	35
Philco (Battery Division)	—
Phillips Electric Works, Inc.	—
Porcelain Products, Inc.	—
Porter, Inc., H. K.	—
Premax Sales Division, Chisholm Ryder Co., Inc.	—
Raytheon Mfg. Co.	—
Ray-O-Vac Company	—
Rebuilt Electric Equipment Co.	—
Reliable Electric Co.	4
Remington Rand, Inc.	—
Roebling's Sons Co., John A.	—
Schauer Machine Co.	35
Seymour Smith & Sons, Inc.	—
Shallcross Mfg. Co.	—
Sloan & Cook	35
Sparta Manufacturing Co.	35
Stewart Brothers	—
Stromberg-Carlson Telephone Mfg. Co.	13-14
Sturgis Posture Chair Co.	—
Suttle Equipment Co.	—
Telephone Repair Co.	—
Telkor, Inc.	—
Union Carbide & Carbon Corp.	—
United States Steel Corp.	—
Utica Drop Forge & Tool Corp.	—
Valentine Clark Corporation	35
Wagner-Malleable Products Co.	—
Western Electric Co.	—
Weston Electrical Instrument Corp.	—
White, Weld & Company	33
Wood Preserving Corp., The, a Koppers subsidiary	—
Wopat, J. W.	35
Wray & Co., J. G.	35



EASY TO PLACE—
SURE TO STAY—
SIMPLE TO HANDLE—

NATIONAL CABLE RINGS



You can pull the cable either way—to meet the job requirements. You don't ever have to reride the messenger to replace or respace rings. In fact you simplify and speed up the whole job of cable hanging when you use National Regular or Extra Long Cable Rings.

The special design of National Rings assures quick easy placing of the rings and the "tension grip" holds them rigidly in position. Once they are placed "Nationals" will not slip along or jump off the messenger.

National Extra Long Rings are big time and money savers for they are designed to enable you to hang an additional cable on the existing strand, where extra service is necessary. This means, of course, the saving of the entire cost of a new messenger.

Another big advantage of National Rings, one that is especially appreciated by the men who must do the job of ringing, is the clever "Handy Five" Clusters in which they are gathered. This neat packaging eliminates all hooking together of rings in cartons or linemen's pails and does away with ground litter.

National Rings are made from the finest materials procurable and are hot-dip galvanized by a special process assuring maximum smoothness. Both Regular and Extra Long Rings are carried in a wide range of sizes. Order "Nationals" from your jobber today and save time and money on all your ringing jobs.

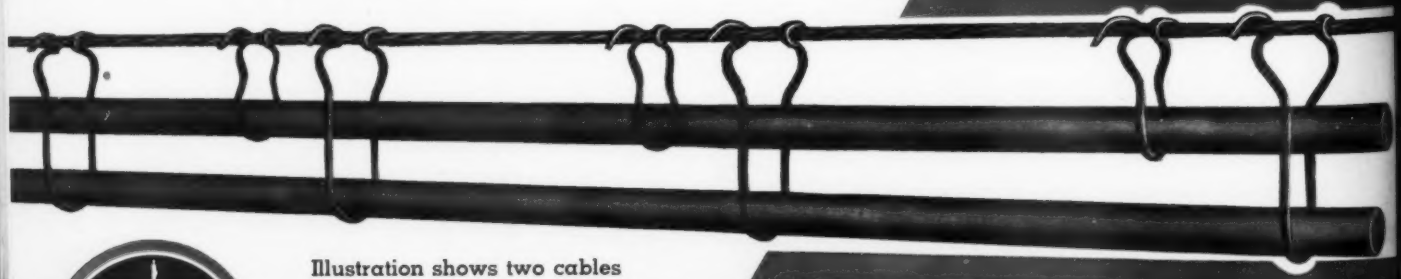


Illustration shows two cables hung on single strand with National Regular and Extra Long Rings

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